

MANUAL ON ECONOMIC EVALUATION OF HIGHWAY PROJECTS IN INDIA

(Second Revision)



**INDIAN ROADS CONGRESS
2009**



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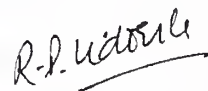
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FOREWORD

The Special Publication Number 30 on “**Manual on Economic Evaluation of Highway Projects in India**” was first published by the Indian Roads Congress in the year 1984 and subsequently revised version of this manual was published in 1993. Since 1984, this manual has been recognized as an invaluable tool for the highway engineers, who are not professional transport economists by education or training, to understand and evaluate the economic implications of a highway project. It was very well received by highway professionals all over the country.

However, during the last decade, the equations for Vehicle Operating Cost (VOC) and other parameters provided in the manual has become obsolete considering two important reasons. Firstly, the economic liberalization process initiated in India more than fifteen years ago has resulted in the entry of vehicles having better fuel-efficiency and also possessing excellent pick-up in the Indian market. Due to this, it has become imperative that the research on road user cost has to be reviewed and updated periodically so as to adequately represent the changed conditions. Secondly, the cost parameters considered in the first revision of this manual has also undergone radical changes during the intervening period due to cost escalations.

In view of the above, the research scheme sponsored by the Ministry of Shipping, Road Transport and Highways (*MOSRTH*) titled, “**Updation of Road User Cost Data**” conducted by Central Road Research Institute, New Delhi in 2001 has served as the backbone for bringing out this updated version *i.e. second revision* of this manual. Further, the research findings obtained from other studies have also been incorporated in this updated version. The updated VOC equations incorporated in this manual accounts for changes in the new generation vehicles in terms of their operating characteristics coupled with design characteristics of the roads. Therefore, this manual is expected to be a valuable tool for working out economic justification of medium and large sized highway projects. It is hoped that the highway engineers as well as consultants will be able to use this revised manual for making comparative evaluation of choices with respect to the road development programmes.



(R.P. Indoria)

Secretary General,
Indian Roads Congress

April 2009

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GLOSSARY OF TERMS

B/C	: Benefit - Cost ratio
BI	: British Towed Fifth Wheel Bump Integrator
CA	: Compound Amount
CF_D	: Distance Related Congestion Factor
CF_T	: Time Related Congestion Factor
CIF	: Compound Interest Factor
CMV_{SR}	: Value of Commodity on Secondary Routes in Rs/km
CMV_{TR}	: Value of Commodity on Trunk Routes in Rs/km
CRF	: Capital Recovery Factor
CV	: Curvature in deg/km
CW	: Crew Wages in Rs/km
$DC_{(ET)}$: Depreciation Cost Excluding Taxes in Rs/km
$DC_{(IT)}$: Depreciation Cost Including Taxes in Rs/km
DCF	: Discounted Cash Flow
EOL	: Engine Oil in litres/1000 km
$F_{(ET)}$: Fixed Cost Excluding Taxes in Rs/km
$F_{(IT)}$: Fixed Cost Including Taxes in Rs/km
FC	: Fuel Consumption in cc/km
FL	: Fall in m/km
G	: Grease in kg/10,000 km
HCV	: Two-Axle Heavy Commercial Vehicles
IRI	: International Roughness Index
IRC	: Indian Roads Congress
km	: Kilometre
LC	: Maintenance and Labor Cost in Rs/km
LCV	: Light Commercial Vehicles
MAV	: Multi-Axle Heavy Commercial Vehicles
MOSRTH	: Ministry of Shipping, Road Transport and Highways
MOST	: Ministry of Surface Transport
NHDP	: National Highway Development Program
NPV	: Net Present Value

IRC:SP:30-2009

$NP_{(ET)}$: New Price of the Vehicle Excluding Taxes in Rs
$NP_{(IT)}$: New Price of the Vehicle Including Taxes in Rs
O-D	: Origin - Destination
OL	: Other Oil in litres/10,000 km
PCU	: Passenger Car Units
PT_{SE}	: Value of Passenger Time on Secondary Route in Rs/km
PT_{TR}	: Value of Passenger Time on Trunk Route in Rs/km
PW	: Present Worth
PT_{SE}	: Value of Passenger Time on Secondary Routes
PT_{TR}	: Value of Passenger Time on Trunk Routes
PMGSY	: Pradhan Mantri Gram Sadak Yojana
Q	: Volume of Traffic in PCUs/hour
RF	: Rise and Fall in m/km
RG	: Roughness in mm/km
RS	: Rise in m/km
Rs	: Indian Rupees
RUCS	: Road User Cost Study
SCA	: Compound Amount Factor of uniform Series
SFF	: Sinking Fund Factor
SF1, SF2... SF108	: Speed-Flow Equations-2001 for varying road widths on different terrains
$SP_{(ET)}$: Spare Part Cost Excluding Taxes in Rs
$SP_{(IT)}$: Spare Part Cost Including Taxes in Rs
SPW	: Present Worth Factor
t	: Tonnes
TL	: Tyre Life in km
UPD	: Utilization Per Day in km/day
URUCS	: Updation of Road User Cost Study
V	: Speed in km/h
V-C	: Volume-Capacity Ratio
V_{2W}^{2L}	: Free Speed of Two Wheelers on Two-Lane in km/h
V_{2W}^{4L}	: Free Speed of Two Wheelers on Four-Lane in km/h
V_{2W}^{IL}	: Free Speed of Two Wheelers on Intermediate Lane in km/h
V_{2W}^{SL}	: Free Speed of Two Wheelers on Single Lane in km/h

V_{CARS}^{SL}	: Free Speed of Cars on Two-Lane in km/h
V_{CARS}^{4L}	: Free Speed of Cars on Four-Lane in km/h
V_{CARS}^{IL}	: Free Speed of Cars on Intermediate Lane in km/h
V_{CARS}^{SL}	: Free Speed of Cars on Single Lane in km/h
V_{avg}	: Average Value of Commodity per tone
V_{BUS}^{2L}	: Free Speed of Buses on Two-Lane in km/h
V_{BUS}^{4L}	: Free Speed of Buses on Four-Lane in km/h
V_{BUS}^{IL}	: Free Speed of Buses on Intermediate Lane in km/h
V_{BUS}^{SL}	: Free Speed of Buses on Single Lane in km/h
V_{HCV-2}^{2L}	: Free Speed of Two-Axle Heavy Commercial Vehicles on Two-Lane in km/h
V_{HCV-2}^{4L}	: Free Speed of Two-Axle Heavy Commercial Vehicles on Four-Lane in km/h
V_{HCV-2}^{IL}	: Free Speed of Two-Axle Heavy Commercial Vehicles on Intermediate Lane in km/h
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V_{LCV}^{IL}	: Free Speed of Light Commercial Vehicles on Intermediate Lane in km/h
V_{LCV}^{SL}	: Free Speed of Light Commercial Vehicles on Single Lane in km/h
V_{MAV}^{2L}	: Free Speed of Multi-Axle Heavy Commercial Vehicles on Two-Lane in km/h
V_{MAV}^{4L}	: Free Speed of Multi-Axle Heavy Commercial Vehicles on Four-Lane in km/h
V_{MAV}^{IL}	: Free Speed of Multi-Axle Heavy Commercial Vehicles on Intermediate Lane in km/h
V_{MAV}^{SL}	: Free Speed of Multi-Axle Heavy Commercial Vehicles on Single Lane in km/h
VOC	: Vehicle Operating Cost
WPI	: Wholesale Price Index
VOT	: Value of Passenger Time

1 INTRODUCTION

1.1 During the last forty years, a number of research studies^{1,3,4,10,12,14,15,16} have been conducted to understand the relationship between the standards of road design (*which depends upon the investments/costs*) and the road user cost. Further, the changing vehicle technology, traffic mix and road conditions have necessitated the research on road user cost to be reviewed and updated periodically so as to adequately represent the changed conditions. For a proper assessment of economics of road projects, it is felt prudent to develop a uniform method of economic evaluation based on realistic quantification of costs and benefits. Moreover, this would facilitate rapid evaluation so that a large number of schemes/alternatives can be broadly evaluated to assist the decision makers in their job. Based on the above studies, the Manual on Economic Evaluation of Highway Projects in India was first published in 1984 and subsequently revised in 1993. However, it was noted that this Manual had become outdated and therefore it was felt essential to update this Manual in the light of Road User Cost (RUC) data developed based on the research scheme of the Ministry of Shipping, Road Transport and Highways (MOSRTH) conducted in 2001. In view of this, Transport Planning, Traffic Engineering and Road Safety Committee (H-1) of Indian Roads Congress had decided in its first meeting held on 16 June 2006 to undertake the 'second revision' of this publication. The composition of the H-1 Committee is as given below:

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In the second meeting of the H-1 Committee held on 26 September, 2006, Ms. Amanita Singh, Feedback Ventures Limited, New Delhi and Dr. S. Velmurugan, Scientist, Central Road Research Institute (CRRRI), New Delhi gave presentations before the H-1 Committee based on their research work. After detailed discussions, the H-1 Committee constituted a sub-committee consisting of Dr.L.R.Kadiyali (*Convener*) and Dr.S.Velmurugan for finalising the revised document combining these efforts. The H-1 Committee approved the draft revision of SP:30 submitted by the above sub-committee in its meeting held on 11 January, 2008 subject to incorporation of comments by a sub-group consisting of S/Shri S.C. Sharma, V.K.Sinha, Dr. L.R. Kadiyali and Dr.S.Velmurugan. This sub-group highly appreciated the excellent work done by Dr. L.R. Kadiyali and Dr.S.Velmurugan in bringing out this revised document. Subsequently, H-1 Committee again considered the draft document of IRC:SP:30 during the meeting held on 4 November, 2008 and recommended that it may be forwarded to the Council through Highways Standards and Specifications (HSS) Committee. The HSS Committee approved the modified draft in its meeting held on 23, November 2008. Thereafter, the Council of IRC in its meeting held at Kolkata on 13, December 2008 considered the 'second revision' of IRC:SP:30 and approved for publication.

Shri Gurdip S. Khinda, Technical Adviser, IRC provided help in editing the document to eliminate any inconsistency in style, punctuation, capitalization, spelling, etc. as per guidelines in IS:12:2005 and IS:1250:1958 (*Reaffirmed 2003*).

1.2 For a developing country like India, roads and road transport play an important role in economic growth. The construction of roads brings about a variety of benefits that are enjoyed practically by all sectors of the economy. The scarcity of resources and competing demands from various sectors are the dominating features of a developing economy. It, therefore, becomes extremely necessary to allocate the scarce resources in the most beneficial manner amongst various sectors and, within a sector, amongst various schemes. In the absence of an adequate database, highway planners in India have been selecting schemes on a tentative basis, depending primarily on past experiences. It is quite likely that such an ad-hoc approach might lead to the selection of wrong solutions. For example, the planners so far placed a heavy reliance on the cost of construction of the facility initially, which they could estimate accurately, when selecting alternative schemes. Other important aspects such as the cost of maintaining the facility in future and the cost borne by the road user were disregarded.

1.3 With the accomplishment of the Road User Cost Study (*RUCS*) completed in India in 1982 and the subsequent updating of RUCS data carried out in 1992 and 2001, it is now possible for the highway planners to evaluate the benefits from highway projects on an accurate basis. Consequently, economic analysis of highway projects has become more scientific and rational.

1.4 Highway economic analysis, also known as highway project appraisal is a technique whereby the costs of and benefits from a scheme are quantified over a selected time horizon and evaluated by a common yardstick. The technique is also known as Benefit-Cost (*B-C*) analysis.

1.5 Economic evaluation serves a number of purposes^{6,7,13,18,19} which included the following:

- i) Preparation of highway plans at the national, regional or local level within the overall development plan.
- ii) To rank schemes within the highway sector plan competing for scarce resources in order of priority.
- iii) To assess in phasing the road programme over a period of time depending upon the availability of resources.

- iv) To compare mutually exclusive schemes and select the most attractive.
- v) To determine whether a scheme under consideration is worth investing.
- vi) To evaluate alternative strategies such as stage-construction or full construction; alternative specifications such as flexible pavement or rigid pavement; alternative policies such as increased outlay on maintenance or increased outlay on rehabilitation; alternative design standards and alternative policy options on axle loads.

The present manual is intended to help the highway planners and engineers in India to undertake economic evaluation of highway projects under non-urban conditions. The manual has been prepared from various published books and other sources which have been referenced so that the more inquisitive reader may be able to reach the original material if need be.

2 BASIC CONCEPTS OF ECONOMIC ANALYSIS

2.1 The subject of highway economic analysis has developed during the past five decades through the contribution of analysis belonging to various disciplines and notably highway engineers and economists. There were many issues on which conflicting view points prevailed in the early stages of the evolution of the subject, but with the passage of time, there is now a general agreement on many important concepts. The analyst now has the advantage of the collective wisdom of the earlier practitioners of the art.

2.2 National View Point

In the highway sector, the construction and maintenance of the highways are financed from government funds, whereas the highway user is the general public. This implies that the costs of construction and maintenance are borne by the government, whereas the benefits arising out of highway construction and improvements are reaped by the general public. The construction of a highway or its improvement may also have an effect on another mode of transport, such as the railways, wholly owned and operated by the government. It is, therefore, logical that the multiplicity of interests can be encompassed if the economic analysis is done from a national view point, rather than a restricted view point of the government or one of its wings or the public at large. This implies that consequences to any person or anybody in the country should be accounted for in the analysis.

2.3 Difference between Economic Analysis and Financial Analysis

In financial analysis, one is concerned with the ways and means of financing a project (*by floating bonds or by levying toll*) and the financial profitability of the project. Economic analysis, on the other hand, is not concerned with the sources of financing, the availability of funds and the allocation of funds^{17, 18}. As such, funding of projects is a management decision. For example, the construction of a tolled highway or expressway has to be examined on the basis of its cost and the expected toll collections and the management may take a decision to construct the same if the toll collection seems to be attractive enough. Such an analysis is financial in nature. Economic viability which concerns with the consequences to all segments of the society, will still be necessary in such a case to establish its economic viability. However, even after the economic viability of a project has been established, the government may not take up the project due to lack of funds or because of the fact that the financial analysis has indicated that the returns are not attractive for the funding and recovery procedure selected.

2.4 Analysis is a Study of the Future

Economic analysis is not concerned about past events and investments. It is essentially a study of the future. The analysis, therefore, should estimate future traffic, costs and benefits.

2.5 All Possible Alternatives should be Considered

The very basis of economic analysis being the selection of the most attractive option and in this regard, it is necessary that the analyst evaluates a number of possible alternatives. Of course, the basic alternative is the 'do-nothing', or the continuation of the present situation. All other alternatives are evaluated against this basic condition.

2.6 Marginal Differences

When considering a number of alternatives, it is not sufficient to evaluate each of them against the basic "do-nothing" alternative. It is also advantageous to consider the marginal differences in costs and benefits between two alternatives and carry out incremental analysis to establish whether the increment in investment also yields justifiable incremental benefits.

2.7 All Consequences should be Considered

The investments on highways bring about a variety of consequences, some of which can be quantified into monetary terms and some cannot. All consequences which can be quantified monetarily should be considered and included in the analysis. Non-quantifiable effects should also be identified and presented to the decision maker.

For example, impact of the project on the environment is an extremely important consideration in building highways. But it is very difficult to quantify in monetary terms the adverse effect on environment. All the same, at the Project Appraisal stage, the highway engineer must at least qualitatively highlight the effect on environment.

2.8 Analysis Period should not Extend Beyond the Period of Reliable Forecasts

There is considerable uncertainty of forecasts beyond a certain reasonable period. Human behaviour may change, travel pattern may undergo a shift and technology may experience transformation. Thus it is worthwhile to limit the analysis period to one of reliable forecasts. Moreover, since future costs and benefits are to be discounted, the inclusion or omission of costs or benefits beyond a reasonable period is hardly likely to influence the results. A period of 15-20 years beyond the completion of the project is generally considered for highway projects whereas in the case of expressway projects, the analysis period is considered up to 25 years.

2.9 All Future Cash Flows to be brought to a Common Time Datum

The present and future costs and benefits occur at different points of time. In order to evaluate them on a common basis, they should be reduced to equivalent values at a common date. This procedure is known as discounted cash flow and is based on the concept of time value of money.

2.10 Cost and Benefit Components of Equal Magnitude

There may be some cost and benefit components which remain equal in magnitude for all the alternatives. They may be omitted since they will in any case cancel out in the analysis.

3 TIME VALUE OF MONEY

3.1 Concept of Time Value of Money

Money appreciates in value in course of time due to the interest it earns. To illustrate the concept, consider Rs 100 today, which if invested at 10 percent compound rate of interest, becomes Rs 673 at the end of 20 years. Thus, Rs 100 today is worth Rs 673 at the end of 20 years. In other words, Rs 673 at the end of 20 years is worth only Rs 100 now. This concept helps the analyst in reducing all future costs and benefits to a common date and thus evaluate on a common basis. The concept is thus the foundation on which the entire structure of economic analysis is built.

3.2 Definition of Commonly Used Terms

Interest is defined as the money paid for borrowed money. It also indicates the return obtainable by the productive investment of capital.

Interest Rate is the interest paid or the return obtained at the end of one year, expressed as a percentage of the capital at the beginning of the year. Interest rate can be either simple rate (*where the interest is paid to the lender every year*) or compound rate (*where the interest accrued is added to the capital*).

Present Worth is the present value of a future payment or a series of future payments at the given rate of interest. In the example given in Para 3.1, the present worth of Rs 673 at the end of twenty years is Rs 100 at a rate of interest of 10 percent per annum (*compound*).

Discounting is the process of calculating the present worth of a future payment. Thus, in the above example, Rs 673 at the end of twenty years, when discounted at 10 percent per annum, amounts to Rs 100 at the present time. Discount rate is the interest rate at which future payments are reduced to a common time.

Rate of Return is the term commonly used in economic analysis for the rate at which economic benefits are obtained by a project. Though it generally means the same as interest rate of discount rate are more appropriate in economic analysis. The term interest rate is more commonly used while borrowing capital.

Minimum Attractive Rate of Return (MARR) is that rate of return which must be ensured in any project if it has to be selected for implementation.

3.3 Compound Interest Equations

The mathematical problems involving compound interest have been simplified by the use of six standard equations presented in Table 1.

The ready-made tables indicating the values of the above mentioned factors for various values of interest rates are given in Annex A. The use of the tables presented in Annex A is illustrated in the following examples:

Example 1:

Find the future worth of Rs 100 000 at the end of 20 years invested at a compound rate of interest of 12 percent per annum.

From Table 45,	=	9.6463
CA (12%, 20 years)	=	Rs 100 000 x 9.6463
Therefore, future worth at the end of 20 years	=	Rs 9 64 630.

Table 1 Compound Interest Equations

Equation	Use	Factor
$F = P (1 + i)^n$	Given P to find F	$(1 + i)^n$ is known as Compound Amount (CA) Factor
$P = \frac{F}{(1 + i)^n}$	Given F, to find P	$\frac{1}{(1 + i)^n}$ is known as Present Worth (PW) factor of single sum
$F = \frac{(1 + i)^n - 1}{i} * A$	Given A, to find F	$\frac{(1 + i)^n - 1}{i}$ is known as Compound Amount Factor of uniform series (SCA)
$A = F * \frac{i}{(1 + i)^n - 1}$	Given F, to find A	$\frac{1}{(1 + i)^n - 1}$ is known as Sinking Fund Factor (SFF)
$P = \frac{(1 + i)^n - 1}{i * (1 + i)^n} * A$	Given A, to find P	$\frac{(1 + i)^n - 1}{i * (1 + i)^n}$ is known as Present Worth Factor of Uniform series (SPW)
$A = \frac{i(1 + i)^n}{(1 + i)^n - 1} * P$	Given P, to find A	$\frac{i(1 + i)^n}{(1 + i)^n - 1}$ is known as Capital Recovery Factor (CRF)

where,

P = present sum of money

i = interest rate (*compound*) per annum

n = number of years

F = sum of money at a future date

A = end-of-year equal annual payments for n years

Example 2:

What is the present worth of a sum of Rs 75 000 at the end of 10 years when the discount rate is 10 percent per annum?

From Table 44,

PW (10%, 10 years) = 0.3855

Therefore, present worth at the end of 1 year = Rs 75 000 x 0.3855

= Rs 28 912.50

Example 3:

The annual cost of maintenance of a new road thrown open to traffic is Rs 15 00 000. What is the future worth of this expenditure at the end of 10 years when the rate of interest is 15 percent per annum?

From Table 46,

$$\text{SCA (15\%, 10 Years)} = 20.3037$$

$$\begin{aligned}\text{Therefore, future worth at the end of 10 years} &= \text{Rs } 15\,00\,000 \times 20.3037 \\ &= \text{Rs } 30\,455\,550\end{aligned}$$

Example 4:

A major rehabilitation of a pavement will be done 10 years from hence at a cost of Rs 100 lakh. What should be the series of uniform annual payments that must be set apart to accumulate this amount, if the interest rate is 9 percent per annum?

From Table 43,

$$\text{SF (9\%, 10 years)} = 0.0658$$

$$\begin{aligned}\text{Therefore, amount of uniform annual payment} &= 0.0658 \times \text{Rs } 100 \text{ lakh} \\ &= \text{Rs } 6.58 \text{ lakh}\end{aligned}$$

Example 5:

The annual maintenance cost of a major bridge is Rs 50 000. What is the present worth of this cost incurred for 10 years after the opening of this bridge? The discount rate may be taken as 12 percent per annum.

From Table 45,

$$\text{SPW (12\%, 10 years)} = 5.6502$$

$$\begin{aligned}\text{Present Worth} &= \text{Rs } 50\,000 \times 5.6502 \\ &= \text{Rs } 282\,510\end{aligned}$$

Example 6:

The cost of construction of a new facility is Rs 200 crore at current price and is met with by raising a loan. What is the annual payment of equal amount for 20 years to repay the loan, if the rate of interest is 10 percent per annum?

From Table 44,

$$\text{CR (10\%, 20 Years)} = 0.1175$$

$$\begin{aligned}\text{Equal annual payment to repay the loan} &= 0.1175 \times \text{Rs } 200 \text{ crore} \\ &= \text{Rs } 23.50 \text{ crore.}\end{aligned}$$

4 TOTAL TRANSPORTATION COST

In highway economic analysis, one has to consider the total transportation cost, which comprises the following:

- 1) Cost of construction of the facility initially
- 2) Periodic cost of maintaining the facility over its design life
- 3) Road User Cost

The three components are interdependent, and the designer has to choose that alternative which holds the sum total of the three to a minimum. Road User Cost is composed of the following main components:

- 1) Vehicle Operating Cost
- 2) Time Cost
- 3) Accident Cost

The detailed discussions on the determination of costs and benefits for economic analysis are given later.

5 DETERMINATION OF HIGHWAY COSTS

5.1 The first two components of the total transportation discussed earlier, viz. the cost of construction of the facility initially and the periodic cost maintenance of the facility over its design life are known collectively by the term 'highway costs'.

5.2 The cost of construction of the facility includes the following:

- i) Survey, investigation and design costs
- ii) Land acquisition costs
- iii) Construction costs
- iv) Physical contingencies (*unforeseen items and unforeseen increase in cost not attributable to escalation and unforeseen increase in quantities*)
- v) Supervision, quality control and administration charges

5.3 The cost of maintenance of the facility includes the following:

- 1) Ordinary repairs such as patch repairs, pot-hole filling, dressing earth work, etc.
- 2) Periodic repairs, such as renewals and resurfacing
- 3) Any emergent or special repairs
- 4) Operational expenses, such as traffic signals, traffic aid posts, lighting, policing etc.
- 5) Supervision and administration charges.

5.4 When dealing with the highway costs, it is necessary to phase the same year by year. For example, if a project estimated to cost Rs 100 crore is sanctioned now, the expenditure will generally be incurred over a period of 3-5 years depending upon various factors. It is necessary to break-down the outlays in each year of its construction. As an illustration, the breakdown of cost for a road project amounting to Rs 100 crore is given in Table 2.

Table 2 Breakdown of Cost Outlay

Year	Cost (Rs in Crore)
1	10.0
2	20.0
3	30.0
4	40.0
Total	100.0

Similarly, in the case of maintenance costs, year-by-year costs have to be identified. Thus, if the yearly maintenance cost of the highway project illustrated earlier are Rs 0.50 crore and the cost of renewal of the surface once in five years is Rs 2.00 crore, it will be represented as given in Table 3.

Table 3 Breakdown of Cost Outlay during Construction and Maintenance Periods

Year	Cost (Rs in Crore)
1	Construction Period
2	
3	
4	
5	0.50
6	0.50
7	0.50
8	0.50
9	2.00
10	0.50
11	0.50
12	0.50

and so on, repeating the cycle, till the design life of the project.

5.5 Difference between Economic Costs and Financial Costs

In economic analysis, one is concerned with economic costs and not financial costs. Financial costs are easy to determine, because they represent the actual amount one has to pay to get a road constructed and maintained. They are the engineer's estimates to get the project sanctioned and they are shown in the account books and budgets. In a perfectly competitive market and where taxes are not levied, the financial cost is very nearly equal to the economic cost. But when the market is imperfect and where taxes are levied, the financial costs and economic costs are not the same. Economic costs are based on the "opportunity cost" of each of the constituent costs such as labour, material and machinery. In order to derive the economic costs, these constituents have to be isolated, quantified and adjusted on the basis of certain principles discussed in the succeeding section.

5.6 Shadow Pricing

In many developing countries, a considerable amount of distortions have arisen in the prices as a result of government policies, regulations and bad investment planning. This scenario is true in the case of Indian situation as the domestic prices of many commodities are administered by the government and the traded prices are not at par with the international market prices. The minimum wages, especially of unskilled labour are also fixed statutorily by the government, and in an over-populated and labour-surplus economy like India, the wages do not truly reflect the economic cost. Foreign exchange is extremely precious for the Indian economy, but the official exchange rate does not reflect this. Adjustments needed in the prices of goods and wages to make them reflect truly their market value are known as shadow pricing.

The wages of unskilled labour are regulated by the government and are also determined by the bargaining power of the trade unions. Since there is a large unemployment problem in this sector in the country, the wages paid do not reflect the surplus conditions. If true market forces were to be at work, the wages might probably come down. The exact determination of the shadow wage rate depends upon a number of factors and this indeed is a complicated matter. For Indian conditions, it is assumed that the shadow wage rate is half the actual wages paid. For semi-skilled and skilled labour, there is no need to do shadow-pricing since there is generally a scarcity of these categories and the market wages more or less reflect this situation. If the analyst has reasons to believe that the statutory wage rates are low, there is a justification for an upward shadow-pricing of semi-skilled and skilled labour wages. The current practice in the Project Appraisal Division of the Planning Commission is not to segregate labour component and not to use shadow wage rate⁵.

India is by and large self sufficient in highway construction machinery and materials needed for the project. Nevertheless special occasions may arise when some items of modern equipment or some materials have to be imported. For example,

sophisticated state of the art hot mix plants, paver finishers and concrete paving equipment may have to be imported for major projects. Foreign exchange is scarce in a developing country like India and to value the import cost at the official exchange rate would be to disregard this fact. Hence, the general practice in the country is to shadow price foreign exchange at 25 percent above the official rate.

Certain commodities are both produced locally and imported. A typical example is fuel oil. The domestic price may not reflect the true international price. In such cases, it is desirable to consider the border price (*price at the country's border, which is the c.i.f. price*). It is, of course, a debatable point whether the border price should further be adjusted to reflect foreign exchange out-go in the case of imports. If such adjustment is done, it should bear a relation to the ratio of import to domestic production of the commodity.

Taxes are levied by the Government on a number of items of goods which are inputs to the cost of highway project. They include import duty, excise duty and sales tax. Such taxes do not represent an economic cost as they are not part of the cost of resources used in the production of the goods. They are in fact transfer payments within the economy. Similarly, license fees fall into the same category. Certain commodities may be sold in the country of subsidized rates. Such subsidies should be disregarded in economic evaluation.

All the above principles of shadow pricing apply equally to the cost streams (*namely, highway construction and maintenance cost*) and the benefit streams (*namely, road user benefits*). As an approximation in many of the projects taken up in India, a factor of 0.80 - 0.90 has been used to convert financial costs of road works to economic costs.

5.7 Treatment of Inflation

The construction of a highway project takes a number of years and during this period, the cost of labour, materials and equipment may undergo an inflationary trend. Similarly, the benefits of reduced Vehicle Operating Costs may be higher in future years due to inflation. Since general inflation results in the price rise in all goods, the relative prices remain constant. Hence, it is the practice to disregard escalation and inflation, both on the cost stream and the benefit stream. However, changes in relative prices should be allowed at least upto the extent that they can be foreseen accurately which can help in demonstrating how they affect costs and benefits differently.

5.8 Interest on Capital Cost of Construction

Highway projects in India are at present financed from government funds as well as from private funds in the case of National Highways Development Project (NHDP) road projects implemented under Build Operate and Transfer (BOT). In the case of

government funded projects, there is no need to include yearly interest on the initial cost of construction in economic analysis whereas in the case of BOT projects, it is necessary to include interest charges.

6 DETERMINATION OF BENEFITS

6.1 The quantification of economic benefits from highway projects is usually much more difficult than determination of costs. This is because of the following reasons:

- Benefits from highway are varied in nature, some of them are direct and some indirect. Direct benefits such as reduced Vehicle Operating Costs can be easily measured, whereas indirect benefits such as improved agriculture and accelerated growth of the economy cannot be measured easily.
- Even when the benefits are direct, some of them are difficult to quantify. Examples are: value of passenger time savings, value of reduced air pollution, value of reduced noise levels and value of improved aesthetics.
- Benefits which occur in the future are closely related to future traffic, forecast of which is difficult.
- Benefits can be determined only when alternatives are considered. Since there are many alternatives possible, benefits vary with each comparison. If the analyst misses an important alternative, it is likely that an accurate measurement of benefits is missed and what is achieved by evaluation of other alternatives is either an understatement or over-statement of benefits.

6.2 Sometimes, confusion is likely to occur in the minds of analysts whether to treat a particular item, as “costs” or “benefits”. Under these circumstances, the simple rule to be followed to avoid such confusion is to denote the cash out-flows as negative and hence costs, and cash in-flows as positive and hence benefits.

6.3 Types of Traffic Receiving Benefits

Benefits due to highway projects are received by the following categories of traffic:

- i) Normal traffic
- ii) Diverted traffic
- iii) Generated traffic or induced traffic

Normal traffic is the traffic which would have developed on the existing facility whether or not any improvements would be made.

Diverted traffic is the traffic diverted on to, or away from, the route or mode being studied. Thus, the construction or improvement of a road may take away traffic from a railway line. In that case, what appears as a benefit to the highway project due to

increased traffic is actually a loss to the railways. Both should be quantified and accounted for. Similarly, if a bypass is constructed for a congested city, the existing road will be decongested due to traffic diversion and will thus receive some reduction in VOC. This also should be accounted for. Generated (*or induced*) traffic is the new traffic that develops because of new travellers making use of improved or new facility.

The benefits to normal traffic and diverted traffic are evaluated by multiplying the change in user costs by the change in traffic. However, while dealing with generated traffic, the benefits are found by multiplying half the change in user costs by the change in traffic^{8,18}.

6.4 Benefits from Highway Improvements

The benefits from highway improvements can be broadly classified as under:

- a) **Road User benefits**
 - 1) Vehicle Operating Cost (VOC) savings
 - 2) Value of travel time savings
 - 3) Value of savings in accident costs
 - 4) Savings in maintenance costs
- b) **Social benefits**
 - 1) Improvements in administration, law and order and defence
 - 2) Improvements in health and education
 - 3) Improvements in agriculture, industry, trade and mining
 - 4) Improvements in environmental standards
 - 5) Appreciation in value of land adjacent to roads

Considering the existing state of knowledge in the country, it is possible to monetarily quantify only the direct road user benefits. Only when sufficient research is carried out on other aspects can the full quantification of benefits be possible. The present Manual, therefore, restricts itself to only the direct road user benefits.

6.5 Factors Affecting Road User Costs

Research works carried out in India has isolated the effect of the following components on the road user costs^{3,4,10}.

- 1. **Roadway Factors**
 - a) Pavement width
 - b) Pavement surface type and its riding quality, as measured by its roughness

- c) Vertical profile
- d) Horizontal geometry
- e) Number of junctions per Kilometre (*in case of accident costs*)

2. Vehicle Factors

- a) Type
- b) Age
- c) Make
- d) Engine horse-power
- e) Power - Weight ratio

3. Traffic Factors

- a) Traffic volume
- b) Traffic composition
- c) Speed
- d) Congestion

The pavement width (W) is measured in metres and generally has the following values:

Single lane roads	: 3.75 m
Intermediate lane roads	: 5.5 m
Two-lane roads	: 7.0 m
Four-lane (<i>divided</i>) roads	: 2 x 7.0 m
Six -Lane (<i>divided</i>) roads	: 3 x 7.0 m

The Roughness (RG) of the road is measured by the British Towed Fifth Wheel Bump Integrator (BI) and is expressed in mm/km. Table 4 presents the typical values found on Indian roads.

Table 4 Recommended Roughness Values for Roads in India
(*Measured normally using towed fifth wheel Bump Integrator in mm/km*)

Surface Type	Road Condition (<i>in mm/km</i>)			
	Good	Average	Poor	Very Poor
Bituminous Concrete	< 2000	2000 - 3000	4000 - 6000	> 6000
Surface Dressing	< 3500	3500 - 4500	4500 - 7000	> 7000
Premix Bituminous Carpet (<i>Open Graded</i>)	< 3000	3000 - 4000	4000 - 6000	> 6000
Water-Bound Macadam/Gravel	< 8000	8000 - 9000	9000 - 10 000	> 10 000
Cement Concrete	< 2200	2200 - 3000	3000 - 4000	> 4000

The other method of measuring roughness is the International Roughness Index (*IRI*). The following equation presents the relationship between BI and IRI.

$$BI \text{ (mm/km)} = (630 * IRI)^{1.12} \text{ (m/km)}$$

The analyst should obtain the actual values from field measurements and use the above values only when no such measurements have been made.

The vertical profile of the road is measured in terms of metres of Rise and Fall (*RF*) per Kilometre. The horizontal curvature is measured by the average degree of Curvature (*CV*) per Kilometre and the typical values of *RF* and *CV* are presented in Table 5. Fig. 1 depicts the method of quantification of the same.

$$\text{Average curvature of section AB, } CV = \phi_1 + \phi_2 + \phi_3 + \dots + \phi_n / \text{Distance AB (km)} \\ \text{(expressed as degrees/km)}$$

$$\text{Average rise of section AB, } RS = h_1 + h_3 + h_5 + \dots + h_m / \text{Distance AB (km)} \\ \text{(expressed as m/km)}$$

$$\text{Average fall of section AB, } FL = h_2 + h_4 + h_6 + \dots + h_n / \text{Distance AB (km)} \\ \text{(expressed as m/km)}$$

$$\text{Average rise and fall of section AB, } RF = h_1 + h_2 + h_3 + \dots + h_m + h_n / \text{Distance AB (km)} \\ \text{(expressed as m/km)}$$

Table 5 Typical Values of RF and CV for various Terrains in India

Terrain	RF	Curvature	
		Low Curvature	High Curvature
Plain	0-15	Less than 50	Above 50
Rolling	15-30	Less than 100	Above 100
Hilly	30-50	Less than 200	Above 200

RF and *CV* are highly correlated and it is generally sufficient to consider one of the two in the analysis. The number of intersections per Kilometre (*J*) on a road section influences accident rate. In highway economic analysis, the effect of traffic on speeds is important. The research studies conducted^{3,4,10} have enabled the formulation of the speed-flow equations and the same are presented in Annex B.

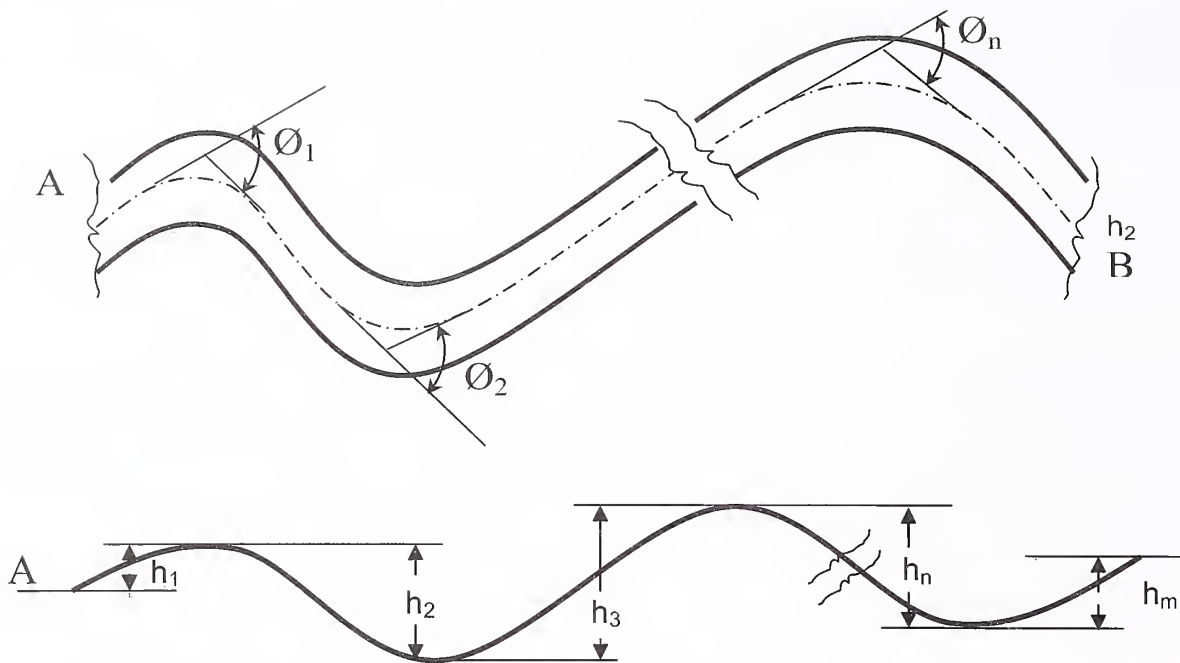


Fig. 1 Methods of Specifying the Curvature and Longitudinal Profile of a Road Section

6.6 Benefits Due to Reduction in Vehicle Operating Cost

The Vehicle Operating Cost (VOC) components are:

- a) Fuel
- b) Lubricants
- c) Tyres
- d) Spare parts
- e) Maintenance labour
- f) Depreciation
- g) Wages of crew
- h) Fixed costs, including overheads administration, interest on borrowed capital, etc.

Annex C presents the equations for determining the VOC components for various types of vehicles forming the basis of the Tables presented in Annex D. As the number of diesel cars is gradually on the increase, the proportion of cars has been taken in the ratio of 75 percent petrol driven cars to 25 percent diesel driven cars based on extensive market surveys from recent studies¹. The VOC values worked for different vehicle types are as per March 2009 price levels and are exclusive of taxes in the case of economic costs and inclusive of taxes in the case of financial costs. The prices of VOC inputs used for preparing the Tables are also presented in Annex D. To obtain the VOC values

for intermediate values of Roughness and Rise/Fall values (*that is, other than those presented in Annex D*), the VOC values presented for a given vehicle type needs to be interpolated accordingly.

It is an established fact that road user cost would increase in accordance with increase in Vehicle Operating Cost which implies that Road User Cost depends upon the change in Wholesale Price Index (*WPI*). Generally, weekly, monthly as well as yearly WPI data can be obtained from the Ministry of Commerce and Industry (*Office of the Economic Advisory Board*)⁵. From their website, it is possible to obtain the weekly WPI data for various commodities including Transport Equipment and Parts, Petrol and High Speed Diesel (*HSD*) as well as the overall WPI for all commodities. For quick estimation of VOC for any year, the WPI index for all commodities can be directly applied. Accordingly, the WPI as on 7 October, 2000 namely on the reference analysis year when the VOC equations were updated by CRRI⁴ was 157.4 whereas the WPI as on 21 March, 2009 is 228.5. Using the ratio between the above two WPI indices, the VOC for the base year (*March 2009*) can be obtained by multiplying the VOC for the year 2000 (*obtained from the updated VOC equations evolved in URUCS 2001 study*⁴) by a factor of 228.5/157.4. Similarly, the ratio of WPI for other relevant individual commodities⁵ can be worked as under:

Transport Equipment and Parts	=	175.5/141.0	=	1.248
Petrol	=	224.2/159.8	=	1.403
High Speed Diesel	=	452.2/249.0	=	1.816

Out of the above factors derived through comparison of WPI, the relevant one may be used by the user for the computation of updated VOC as presented in Annex D.

6.7 Travel Time Savings

Generally, savings in travel time are enjoyed by bus passengers, car passengers and two-wheeler riders. Values at March 2009 price levels⁵ are presented in Table 6.

Table 6 Value of Travel Time of Passengers (*in Rs per hour*)

Sl.No.	Nature of Journey by Passenger	Value of Time	
		Primary Route	Secondary Route
1	Cars	62.5	52.5
2	Two Wheelers	32.0	22.0
3 a)	Ordinary Bus Passenger	39.5	14.5
b)	Deluxe Bus Passenger	43.5	—

Since the passenger travel time savings in a developing country like India are not sometimes considered in economic analysis, the analyst may perform economic analysis with and without this component. The occupancy of cars, two wheelers and buses should be found from actual surveys. In the absence of the same, the values suggested below may be adopted:

Average occupancy of a car	= 4.8
Average occupancy of a two wheeler	= 1.5
Average occupancy of a bus	= 43.0

However, it is to be noted that the above values vary from region to region. For a major project like Expressway, where travel time savings are very significant, the accurate value of time of passengers and commodity in transit may have to be determined. The rates suggested for passenger travel time values have been appropriately accounted by considering 85 percent work trips and 15 percent social/leisure trips based on the studies conducted by CRRI^{3,4}.

In the case of commodities, lesser travel time signifies smaller inventory cost. Speedier travel means that for transporting the same quantity of goods in a certain period, lesser number of commercial vehicles can be used. Speedier travel leads to reduction in the fixed charges per km which every operator has to pay. Quicker travel also results in time savings to the vehicle crew. The savings in travel time are an important component of the benefits from highway improvements. Theoretically, it is possible to visualize the savings in cost of holding inventories by working out the value of goods held during the transport and deriving the interest payment thereon per hour. The value of commodity in transit may be considered separately for different types of commercial vehicles plying on primary and secondary routes. The values presented in Table 7 are the updated values of the study titled, "Updation of Road User Cost Data" conducted by CRRI in 2001⁴ by considering the WPI price levels as of 21 March 2009.

Table 7 Value of Commodity on Primary and Secondary Routes

Type of Route	Vehicle Type	Value of Commodity (Rs/t)	Average Load (t/vehicle)	Commodity Holding Cost (Rs/day)
Primary Route	LCV	35 300	3.2	58.1
	HCV	38 750	9.0	178.0
Secondary Route	MAV	36 300	18.3	333.0
Route	LCV	33 400	3.2	53.8
	HCV	35 550	8.4	148.4

6.8 Accident Cost Saving

As it is possible to predict the reduction in accidents on account of road improvements, the accident cost values evolved from the earlier studies can be used after updating using the ratio of WPI for the economic cost of different types of accidents and economic cost of vehicle damage. The values presented in Tables 8 and 9 are the updated values of the study titled, "Evaluation of Road Accident Costs" conducted by TCS in 1999¹⁷ by considering the WPI price levels as of 21 March 2009.

Table 8 Economic Cost for different type of Accidents

Sl.No.	Type of Accident	Economic Cost of Accidents (<i>in Rs</i>)
1	Fatal	864 350
2	Serious	391 800
3	Major	172 650
4	Minor	30 450

6.9 Congestion Effect

The VOC Tables given in Annex D are for uncongested free flow conditions. As traffic volume on a road increases, the vehicles have to overtake, cross, accelerate and decelerate. These manoeuvres result in drop in speeds and increase in fuel consumption along with wear and tear of vehicles. The effect of congestion on VOC can be considered separately for the distance-related and time-related components.

Table 9 Quantum of Vehicle Damage due to Accidents

Sl.No.	Type of Accident	Economic Cost of Accidents (<i>in Rs</i>)
1	Cars	26 150
2	Two Wheelers	6 650
3	Three Wheelers	7 600
4	Buses	76 050
5	HCV	8 600
6	MAV	1 340 400

The distance-related components are:

- 1) Fuel
- 2) Lubricants

Table 10 Recommended Equations for Time-Related and Distance-Related Congestion Effects for Different Vehicle Types on Varying Road Widths

Sl. No.	Road Type	Cars	Two Wheelers	Buses	Light Commercial Vehicles (LCV)	Two Axle Heavy Commercial Vehicles (HCV)	Multi-Axle Heavy Commercial Vehicles (MAV)
Time-Related Congestion Cost Equations							
1	Single-Lane	$CF_T = 0.747 + 1.458*(V/C)$	$CF_T = 0.911 + 0.807*(V/C)$	$CF_T = 0.838 + 1.307*(V/C)$	$CF_T = 0.880 + 1.200*(V/C)$	$CF_T = 0.858 + 1.101*(V/C)$	$CF_T = 0.858 + 1.101*(V/C)$
2	Intermediate Lane	$CF_T = 0.930 + 1.025*(V/C)$	$CF_T = 0.776 + 0.728*(V/C)$	$CF_T = 0.942 + 0.670*(V/C)$	$CF_T = 1.012 + 0.863*(V/C)$	$CF_T = 0.920 + 1.033*(V/C)$	$CF_T = 0.920 + 1.033*(V/C)$
3	Two-Lane	$CF_T = 1.087 + 0.483*(V/C)$	$CF_T = 0.804 + 0.865*(V/C)$	$CF_T = 0.864 + 0.543*(V/C)$	$CF_T = 0.925 + 0.573*(V/C)$	$CF_T = 0.878 + 0.561*(V/C)$	$CF_T = 0.878 + 0.561*(V/C)$
4	Four-Lane	$CF_T = 0.951 + 0.578*(V/C)$	$CF_T = 1.022 + 0.588*(V/C)$	$CF_T = 1.040 + 0.422*(V/C)$	$CF_T = 1.060 + 0.609*(V/C)$	$CF_T = 0.953 + 0.839*(V/C)$	$CF_T = 0.953 + 0.839*(V/C)$
Distance-Related Congestion Cost Equations							
1	Single-Lane	$CF_D = 0.924 + 0.680*(V/C)$	$CF_D = 0.990 + 0.830*(V/C)$	$CF_D = 1.000 + 1.000*(V/C)$	$CF_D = 1.00 + 0.90*(V/C)$	$CF_D = 1.179 + 0.757*(V/C)$	$CF_D = 1.179 + 0.757*(V/C)$
2	Intermediate Lane	$CF_D = 0.924 + 0.635*(V/C)$	$CF_D = 0.942 + 0.118*(V/C)$	$CF_D = 0.800 + 1.200*(V/C)$	$CF_D = 0.90 + 1.00*(V/C)$	$CF_D = 1.104 + 0.755*(V/C)$	$CF_D = 1.104 + 0.755*(V/C)$
3	Two-Lane	$CF_D = 0.893 + 0.259*(V/C)$	$CF_D = 0.917 + 0.112*(V/C)$	$CF_D = 0.800 + 1.10*(V/C)$	$CF_D = 0.90 + 1.00*(V/C)$	$CF_D = 0.925 + 0.482*(V/C)$	$CF_D = 0.900 + 1.40*(V/C)$
4	Four-Lane	$CF_D = 1.038 + 0.140*(V/C)$	$CF_D = 0.934 + 0.104*(V/C)$	$CF_D = 1.000 + 0.750*(V/C)$	$CF_D = 0.90 + 0.70*(V/C)$	$CF_D = 0.781 + 0.947*(V/C)$	$CF_D = 0.900 + 1.20*(V/C)$

Note: CF_T : Time-Related Congestion Factor; CF_D : Distance-Related Congestion Factor; V/C : Volume - Capacity Ratio.

- 3) Tyre
- 4) Spare Parts
- 5) Maintenance Labour

The time-related components are:

- 1) Depreciation
- 2) Fixed costs
- 3) Wages of crew
- 4) Value of passengers time
- 5) Value of commodity in transit

The study conducted in 2001⁴ has yielded updated relationships given in Table 10. This can be used for arriving at factors which in turn can be utilized for multiplying the distance-related and time-related VOC components presented in the Tables at Annex D.

As regards the time-related VOC components, they can be easily worked out from the Speed-flow Equations given in Annex B as under:

Multiplying factor for determining time-related VOC components under congested traffic conditions

$$= \frac{\text{Intercept given in the Equation (= Free Speed)}}{\text{Speed determined from the Equation under congested traffic flow}}$$

In the above computations, the Volume - Capacity (V/C) ratio is worked out from capacity of various road widths as presented in Table 11. The peak hour volume is assumed to be 10 percent of the daily volume in arriving at the values given in this Table.

Table 11 Capacity Values for Assessing the Effect of Congestion on Plain Terrain⁶

Sl.No.	Road Details	Peak Hour Capacity (<i>in PCU/h</i>)
1	Single Lane	600 (<i>both directions</i>)
2	Intermediate Lane	1600 (<i>both directions</i>)
3	Two-Lane	3000 (<i>both directions</i>)
4	Four-Lane	4300 (<i>one direction viz the major flow</i>)

It should be noted that congestion occurs most severely in the peak hours and less severely during the rest of the day. The hourly traffic variation on the road will then determine the appropriate congestion factors. For the determination of both distance and time-related congestion factors, information on peak hourly traffic flow in terms of PCU is essential. When such information is lacking or not available normally, 8-10 percent of daily traffic volume is considered to represent the peak hourly traffic flow. The congestion factors obtained on the basis of peak hourly traffic are true only to the peak hour conditions and it is inappropriate if the congestion factors are used for 24 hours. Therefore, a correction factor would have to be applied to obtain a realistic value.

To arrive at a correction factor traffic census data available for typical sections of National Highways can be utilized in deriving a factor. From this data, the percentage of traffic for each hour can be established. For two-lane road in plain terrain, a capacity of 30000 PCU/day has been considered appropriate⁶ and this can be distributed over the 24-hour period in accordance with the percentage of volume found in each National Highway. For each hourly traffic, distance and time-related congestion factors can be computed using equations given in Table 10 and Annex B respectively for the following categories of traffic.

- a) Cars
- b) Two Wheelers
- c) Buses
- d) Light Commercial Vehicles (LCV)
- e) Two Axle Heavy Commercial Vehicles (HCV)
- f) Multi Axle Heavy Commercial Vehicles (MAV)

6.10 Benefits from Low Volume Roads

In the case of low volume rural roads, like village roads, the quantification of benefits due to the savings in VOC is not the correct approach for economic analysis. This is because the number of vehicles using village roads is very insignificant which can be as low as 200 vehicles per day. Considering this, it is prudent to assess the benefits on the basis of Producer Surplus. This approach expresses the project benefits directly rather than indirectly *namely in terms of value of net output and income rather than in terms of savings accrued to road users*. This production-oriented interpretation of project benefits is consistent with the present mandate of the government focusing on accelerated rural development through the Pradhan Mantri Gram Sadak Yojana (PMGSY) because it focuses directly on farm level changes and augmentation of road

connectivity to villages. The application of the producer surplus approach means that a significant statistical and other data collection effort is needed to obtain the following:

- a) An accurate description of the principal economic activities (*which may largely fall in the primary sector*) and production techniques and conditions;
- b) An assessment of the minimum incremental amount of expenditure needed to generate increased output in the given economic activities;
- c) Estimates of changes in yields, farm gate and market prices (*for agricultural produce*); and
- d) Determination of marketable surpluses taking into account farmer's own consumption, requirement for seeds, fodder etc.

This statistical effort need to be supplemented with farm budgeting-costing. The value added approach focuses on the difference in the net income of producers (*by economic activity*) and transporters "with" and "without" the road investment and the complementary incremental investments and expenditure (*operating and maintenance costs for generating production*) in each sector/sub-sector of the economy. Since this is an "economic" approach, all the expenditure related to project and revenue should reflect economic costs (*namely, shadow or accounting prices*) which infer and allow for transfer of payments, subsidies and other distortions in prevailing market prices.

By definition, the value added approach does not focus on the financial incentives generated by proposed rural investments. These incentives are, however, critical to the viability of projects and merit considerable attention in the appraisal process.

6.11 Benefits from Construction of a Large Bridge Project

In bridge project appraisal, it is important first to study the present traffic flow pattern. It may comprise of the following:

- a) Service across the river by a small ferry, carrying passengers and light vehicles, and/or
- b) Detouring of vehicles by alternate route, generally over long distance

This will be followed by forecast of average daily traffic over the proposed bridge for the time horizon of the study. This will represent the normal traffic growth and the volume generated by the proposed bridge. The main elements of traffic required for economic

analysis are as follows:

- a) Ferry Traffic
 - i) Normal growth
 - ii) Volume generated by the proposed bridge
- b) Diverted Road Traffic (*from alternate route*)
 - i) Normal growth
 - ii) Volume generated by the proposed bridge

6.11.1 Project costs

The project costs basically include the following:

- a) Capital costs, annually phased over the construction period
- b) Recurring and maintenance costs, and
- c) The sum of (a) and (b) will be the total cost of the project.

6.11.2 Project benefits

The economic appraisal consists primarily of determining the least cost solution to the problem of moving traffic across the river. Two alternatives, bridge and ferry, differ not only in capital and operating costs, but also in the quality of services in that, ferry takes more time and is less convenient. As a result, the traffic levels would, in fact, differ substantially under the two alternatives. The benefits accruing due to the bridge, in case of ferry alternative without any diversion of traffic by alternate route primarily consists of the avoidance of the ferry capital and operating costs and the elimination of delays for vehicles, drivers, passengers and goods. These will be calculated as the time savings for road traffic. In the case of alternate route, VOC and time savings for the diverted traffic (*both passengers and goods*) would also form part of the benefit streams.

6.11.3 Ferry costs

The capital costs will be for the ferry system as a whole which includes the cost of vessel and the terminal facilities. Similarly, the cost of operation will be for both ferry and terminal. These costs will be worked out for the normal traffic.

6.11.4 Elimination of delay

Assuming reasonably efficient ferry services, the difference between it and the drive across the proposed bridge need to be determined. It should be determined taking into account the waiting time for the ferry and boarding and alighting time for passengers and goods as well as vehicles. Based on the normal growth in traffic, annual time savings must be worked out and valued in monetary terms.

6.11.5 Vehicle operating costs

As already indicated in the manual, Vehicle Operating Costs (VOC) will be worked out under two scenarios namely “with” and “without” project condition. Under “without project condition”, the VOC will be determined year by year, on the existing route with the given value of rise and fall, roughness, traffic volume and composition and the travel distance (*lead*) whereas under “with project” condition, VOC will be determined for the proposed route taking into account all the above road and traffic characteristics. VOC savings in “with project condition” will arise first, due to short distance and secondly, on account of less congestion.

6.12 Benefits from Replacement of Railway Level Crossings by Road Overbridge (ROB)

The benefits from the replacement of Railway Level Crossings by ROB are as under:

- Travel Time savings of passengers for the duration of the closure of the gates and immediately after opening of the gates.
- Value of commodity in transit detained for the duration of closure of the gates and immediately after opening of the gates.
- Savings in idle fuel consumption.
- Savings in the cost of maintenance of the level crossing (*wages of gateman etc*).
- Savings due to prevention of accidents, if such data is available from past records.

The expected increase in road traffic coupled with increase in railway closures should be considered over the analysis period and the possibility of doubling of track leading to more closures should be considered. For performing economic viability of constructing the ROB, the relevant information may be collected during the traffic surveys for the estimation of benefits.

7 TECHNIQUES OF ECONOMIC EVALUATION

7.1 Study of Alternatives

It has been emphasized that in the earlier studies^{2,7,11,13,19} that economic analysis is carried out to determine the most realistic solution from among a number of alternatives.

Thus the analyst must visualize the various alternatives that are possible, including the “do-nothing” or “null” alternative, and evaluate each of the alternatives against the “do-nothing” alternative. The results will enable him to determine whether each of the alternatives is worthwhile at all and to rank the alternatives in the order of their attractiveness.

7.2 Marginal or Incremental Analysis

Apart from carrying out the analysis of each of the alternatives against the “do-nothing” alternative, the analyst should also carry out marginal or incremental analysis from one alternative to the other. To illustrate this, let us consider a two-lane road which needs pavement strengthening. Traffic forecasts may indicate that the carriageway needs widening to four-lane divided carriageway as well in the next few years. Thus four alternatives present themselves as follows:

- Alternative 1 : Do nothing
- Alternative 2 : Strengthening two-lane pavement
- Alternative 3 : Strengthening two-lane pavement now and widening the carriageway to four-lanes when it is due
- Alternative 4 : Strengthening two-lane pavement now and widening the carriageway to four-lanes right now.

The above alternatives are in the order of their increasing present costs. The analyst must carry out incremental analysis of:

- Analysis (1) : Alternative 2 against Alternative 1
- Analysis (2) : Alternative 3 against Alternative 2
- Analysis (3) : Alternative 4 against Alternative 3

The results will establish whether the incremental investments will yield the desired benefits.

7.3 Methods of Economic Evaluation

Three common methods of economic evaluations normally adopted are as follows:

- 1) Net Present Value Method
- 2) Benefit - Cost Ratio Method
- 3) Internal Rate of Return Method

All the three methods are based on the Discounted Cash Flow (*DCF*) technique of discounting all future costs and benefits to a common year.

7.4 Net Present Value (*NPV*) Method

In this method, the stream of costs/benefits associated with the project over an extended period of time is calculated and is discounted at a selected discounted rate to give the present value. Benefits are treated as positive and costs as negative and the summation give the Net Present Value (*NPV*). Any project with positive *NPV* is treated as acceptable. In comparing more than one project, a project with the higher *NPV* should be accepted. The *NPV* is algebraically expressed as:

$$NPV_0 = \frac{(B_0 - C_0) + \frac{(B_1 - C_1)}{(1+i)^1} + \frac{(B_2 - C_2)}{(1+i)^2} + \dots + \frac{(B_n - C_n)}{(1+i)^n}}$$

where,

NPV_0 = Net Present Value in the year 0

B_t = Value of benefits which occur in the year t

C_t = Value of costs which occur in the year t

i = discount rate per annum in decimals

n = number of years taken for analysis

The method¹² is illustrated using a simple example given below:

Example 7:

The cost of improving an existing road, 25 km long, is Rs 4.00 lakh per km. Road user costs (*with and without the improvements*), accident costs (*with and without the improvements*) and maintenance costs (*with and without the improvements*) are given in Table 12 for a 10-year period after the completion of the improvements. Assuming a discount rate of 10 percent, find out whether the project is economically justifiable? Use the *NPV* method.

Solution:

The calculations are presented in Table 12.

Cost of improvements (C_i) = Rs 25 x 4 = Rs 100 lakh

NPV = (+ Rs 165.4 - Rs 100) lakh = Rs 65.4 lakh

Since the *NPV* is positive, the project is economically justified.

Table 12

Year (<i>t</i>)	Road User Costs		Accident Costs		Maintenance Costs		Benefits (B_t) Col [3+5+7] - Col [2+4+6]	$B_t - C_t$	$\frac{B_t - C_t}{(1+0.1)^t}$
	With Impr.	Without Impr.	With Impr.	Without Impr.	With Impr.	Without Impr.			
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
0	-	-	-	-	-	-	-	-100.0	-100.0
1	105.5	126.5	1.1	3.1	3.5	2.5	22.0	22.0	+20.0
2	110.3	132.2	1.1	3.1	3.5	2.5	23.1	23.1	+19.1
3	115.8	138.9	1.2	3.5	3.5	2.5	24.4	24.4	+18.4
4	121.6	145.8	1.2	3.7	3.5	2.5	25.7	25.7	+17.6
5	127.6	153.0	1.3	3.8	3.5	2.5	26.9	26.9	+16.7
6	134.0	161.0	1.3	4.0	3.5	2.5	28.7	28.7	+16.2
7	140.7	168.9	1.4	4.2	3.5	2.5	30.0	30.0	+15.4
8	147.8	177.0	1.5	4.4	3.5	2.5	31.1	31.1	+14.5
9	155.1	186.2	1.6	4.7	3.5	2.5	33.2	33.2	+14.1
10	162.9	195.2	1.6	4.9	3.5	2.5	34.6	34.6	+13.4
									+165.4
									-100.0
									=+65.4

7.5 Benefit-Cost (B/C) Ratio Method

There are a number of variations of this method, but a simple procedure is to discount all costs and benefits to their present worth and calculate the ratio of the benefits to costs. Negative flows are considered as costs whereas positive flows as benefits. Thus the savings in the transport costs are considered as benefits. If the B/C ratio is more than one, the project is worth undertaking.

Example 8:

The B/C method⁹ is illustrated using a simple example

An existing single lane road, 30 km long, is to be widened to two lanes. The cost of widening is Rs 10 lakh per km. The vehicle operating costs, accident costs and maintenance costs, with and without widening, for a 10-year period are presented in Table 13. The discount rate is 12 percent. Is the project worthwhile?

Table 13

All Figures in Rs lakh

Year. (t)	Road User Costs		Accident Costs		Maintenance Costs		Benefits (B) [3+5+7]- Costs (C) [2+4+6]	$\frac{B_t-C_t}{(1+0.12)^t}$
	With Impr.	Without Impr.	With Impr.	Without Impr.	With Impr.	Without Impr.		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1	101.5	160.7	2.5	3.6	10.0	7.5	57.8	51.6
2	105.6	168.2	2.6	3.7	10.0	7.5	61.2	48.8
3	110.2	176.3	2.7	3.8	10.0	7.5	64.7	48.1
4	116.2	185.2	2.8	3.9	10.0	7.5	67.6	43.0
5	122.3	190.0	2.9	4.0	10.0	7.5	66.3	37.6
6	128.4	199.5	2.9	4.0	10.0	7.5	69.7	35.3
7	135.6	210.0	3.0	4.1	10.0	7.5	73.0	33.0
8	143.2	219.5	3.1	4.2	10.0	7.5	74.9	30.3
9	149.1	228.2	3.2	4.3	10.0	7.5	77.7	28.0
10	154.6	240.1	3.2	4.3	10.0	7.5	84.1	27.1
Total:								382.8

Cost of the Project = 30 x Rs 10 lakh
= Rs 300 lakh

Benefit/Cost ratio = 382.8/300
= 1.27 greater than 1

Hence, the project is economically justified.

7.6 Internal Rate of Return Method

The Internal Rate of Return (*IRR*) is the discount rate which makes the discounted future benefits equal to the initial outlay. In other words, it is the discount rate which makes the stream of cash flows to zero. Equation in para 7.4 can be rearranged as below (*B₀* being zero):

$$C_0 = \frac{(B_1 - C_1)}{(1+i)^1} + \frac{(B_2 - C_2)}{(1+i)^2} + \dots + \frac{(B_n - C_n)}{(1+i)^n}$$

$$= \sum_{i=1 \text{ to } n} \frac{(B_i - C_i)}{(1+i)^i}$$

The solution to the above equation can be done by trial and error. However, the task of computing IRR is rendered very simple now-a-days due to the availability of this function as an inbuilt one in all statistical software.

If the IRR calculated from the above formula is greater than the rate of interest obtainable by investing the capital in the open market, the scheme is considered acceptable.

7.7 Comparison of the Various Methods of Economic Evaluation

The three methods of economic evaluation described above have their own advantages and short-comings. The B/C ratio method is very widely used by the highway engineers. It, however, suffers from the following drawbacks:

- a) It requires an assumption of a discount rate, which should bear relation to the opportunity cost of capital. It is, however, rather difficult to know the opportunity cost of capital accurately.
- b) The significance of the B/C ratio is ambiguous, and its relative value is difficult to understand and interpret. For instance, if there are two proposals, one with a B/C ratio of 1.05 and the other with a ratio of 1.10, the difference is very difficult to appreciate.
- c) It is somewhat confusing and difficult to decide which items should be termed as costs and placed in the denominator and which as benefits and placed in the numerator.

The IRR method is popular with international lending agencies like the World Bank. It lends itself admirably well for use in a computer-aided design model. It avoids the need for selecting a discount rate initially. The rate derived from computations can be easily compared with the market rate of interest, with which economists, financial experts and bankers are familiar. Its disadvantage is that the computations are tedious and a solution can be obtained only by trial and error. The NPV method suffers from the same disadvantage of B/C ratio method that a rate of discount has to be assumed.

7.8 Selection of Discount Rate

As seen from the discussions above, the selection of an appropriate discount rate (*or interest rate*) is crucial in the B/C ratio and NPV methods.

The choice of the discount rate is governed by a number of complex factors and is dependent on the future availability of finance and the various opportunities for its use. The attitude of the society towards present consumption as against savings for future is an important factor. Will the present generation prefer to consume the resources

now or conserve it for future use by the current or future generation? The answer to this question will give the “social time preference rate of interest”. Another approach is to find out the social yield that the resources employed by a marginal public project would have otherwise generated. This determines the “social opportunity cost rate of interest”. In a truly competitive economy, the two rates of interest would be equal and investments and consumption would then be ideally allocated. But such a situation is difficult to find, and more so in a developing country where capital is very scarce. In such situations, some general guidelines can be given for selecting an appropriate discount rate. Such a rate should not be less than the rate of borrowing or lending by the Government or the market rate of interest. A rate of 12 percent is used by the Planning Commission^{5,15}. A typical worked out example given below explains the various steps involved in the economic analysis.

Example 9:

A two-lane black topped road with earthen shoulders passing through a congested town has the following traffic in the year 2009:

Cars	:	2720
Buses	:	1119
Two-Axle Heavy Commercial Vehicles	:	4284
Multi-Axle Heavy Commercial Vehicles	:	1120
Light Commercial Vehicles	:	1124
Two Wheelers	:	854

An Origin-Destination (O-D) Survey has revealed that the following percentages of traffic are bypassable as presented in Table 14.

Table 14 Percentage of Bye-Passable Traffic

Sl.No.	Vehicle Type	% By passable Traffic
1	Cars	35
2	Buses	50
3	Two-Axle Heavy Commercial Vehicles	40
4	Multi-Axle Heavy Commercial Vehicles	60
5	Light Commercial Vehicles	45
6	Two Wheelers	15

IRC:SP:30-2009

The roughness of the road through the town is 4000 mm/km and is maintained at the same status by carrying out routine repairs and renewals. The road is in plain terrain with $RF = 0$ m/km.

It is proposed to construct a bypass to the town with a two-lane asphalt pavement of 7.0 m wide with 1.5 m black topped shoulders on either side. The roughness of the new pavement will be 2000 mm/km and this value will be maintained through routine maintenance and renewals.

The estimated cost of construction of the bypass is Rs 110 crore which is to be incurred spread over a period of four years as given below:

Year	Spread of Quantum of Investment (<i>in %</i>)
2009	10
2009	20
2009	30
2010	40

Traffic growth rate is expected to be 9 percent per annum for all vehicle types.

Maintenance cost per km is as under:

Existing road through the town : Rs 250 000 per km/year

Bypass : Rs 250 000 per km/year

Similarly, the maintenance cost to be incurred for the existing road after the opening of the bypass road would be Rs 250 000 per km per year. The length of the existing road through the town is 10 km and the proposed bypass length is 11 km. The tax element in construction and maintenance may be taken as 10 percent in all the above cases. The accident costs and value of passenger time may be ignored in the calculations.

Calculate the IRR considering 15 year analysis period namely, 15 year period after opening the road to traffic may be assumed. The capacity of the road is 3000 PCU/h which corresponds to a maximum daily flow of 30 000 PCU with peak hour traffic of 10 percent of daily traffic.

Solution:

The calculation of Internal Rate of Return for the proposal of constructing bypass involves the following steps:

Step 1: To convert the given traffic data in terms of PCU for the given alternative proposals include the following:

Case I : ‘*Do Nothing Case*’: The traffic on the existing road alone is plying.

Case II : After bypass is constructed, the existing road is used by partial traffic.

Case III : The traffic using newly constructed bypass road after it is opened for traffic after a period of four years.

To facilitate the calculation of traffic volume for each of the above scenarios, the percentage of traffic using bypass road is made available as basic data (*refer Table 14*).

Step 2: To calculate yearly traffic volume in terms of PCU/day with a 9 percent growth rate from the year 2009 to 2027. 10 percent of this daily traffic is considered as peak hourly traffic for the purpose of calculating distance-related and time-related congestion factors. Both these congestion factors are to be calculated for a rise and fall (*RF*) value of ‘0’ m/km and Roughness (*RG*) of 4000 mm/km.

Step 3: The distance-related and time-related congestion factors are separately calculated and are corrected by multiplying a factor of 0.8. This is to consider the effect of assuming 10 percent of total daily traffic to represent peak hourly traffic for 24 hours in the computations of congestion.

Step 4: Total Vehicle Operating Costs are calculated for the above three cases using the economic costs of VOC given in Updated Road User Cost study conducted by CRR⁴ and the Congestion Factors determined in Step 3.

Step 5: IRR is calculated using the data developed in Steps 1 to 4.

The typical calculations involved in the computations have been described in this paragraph. The conversion of vehicles into PCU is carried out using the IRC guidelines as per Table 15. The traffic volume data in terms of PCU for all the three envisaged scenarios is presented in Table 16. The traffic data calculated from the year 2009 to 2027 considering traffic growth rate of 9 percent for all the three cases stated in Step 1 is tabulated in Tables 17, 18 and 19. Assuming 10 percent of total daily traffic to represent the peak hourly traffic, the ratio of this traffic volume and the capacity of two-lane road is calculated and tabulated in the last column on Tables 17, 18 and 19. It should be noted that the Volume - Capacity (*V/C*) ratio logically cannot exceed 1 and if any value is greater than 1 it should be equated to 1.

**Table 15 Recommended PCU Factors for Various Types
of Vehicles on Rural Roads⁶**

SI.No.	Vehicle Type	Equivalency Factor
Fast Vehicles		
1	Motor Cycle or Scooter	0.5
2	Passenger Car, Pick-up Van or Auto-rickshaw	1.0
3	Agricultural Tractor, Light Commercial Vehicle	1.5
4	Heavy Commercial Vehicle (HCV) or Bus	3.0
5	Truck-trailer/Multi Axle HCV/Tractors	4.5
Slow Vehicles		
6	Cycle	0.5
7	Cycle Rickshaws	2.0
8	Hand Cart	3.0
9	Horse-drawn vehicle	4.0
10	Bullock Cart*	8.0

*for Smaller bullock-carts a value of 6 has been recommended

Table 16 Traffic Volume Data (2009)

SI No	Type of Vehicle	Number of vehicles per day on existing road (Case I)	Traffic Volume in terms of PCU/day	Percentage of Traffic Bypassable	Balance Traffic using existing road PCU/day (Case II)	Bypassable Traffic PCU/day (Case III)
1	Cars	2720	2720	35	1768	952
2	Buses	1119	3357	50	1679	1679
3	Two-Axle Heavy Commercial Vehicles (HCV)	4284	12852	40	7711	5141
4	Truck-trailer/Multi Axle HCV/Tractors	1120	5040	60	2016	3024
5	Light Commercial Vehicles (LCV)	1124	1686	45	927	759
6	Two Wheelers	854	427	15	363	64

Table 17 Traffic Volume on the Existing Road (Case I)

Year	Cars	Buses	LCV	HCV	MAV	Two Wheelers	PCU/h	V/C Ratio
2009	2720	1119	1124	4284	1120	854	2440	0.81
2010	2965	1220	1225	4670	1221	931	2660	0.89
2011	3232	1329	1335	5090	1331	1015	2899	0.97
2012	3522	1449	1456	5548	1450	1106	3160	1.00
2013	3840	1580	1587	6047	1581	1205	3445	1.00
2014	4185	1722	1729	6591	1723	1314	3755	1.00
2015	4562	1877	1885	7185	1878	1432	4092	1.00
2016	4972	2046	2055	7831	2047	1561	4461	1.00
2017	5420	2230	2240	8536	2232	1702	4862	1.00
2018	5908	2430	2441	9304	2433	1855	5300	1.00
2019	6439	2649	2661	10142	2651	2022	5777	1.00
2020	7019	2887	2900	11055	2890	2204	6297	1.00
2021	7650	3147	3161	12049	3150	2402	6863	1.00
2022	8339	3431	3446	13134	3434	2618	7481	1.00
2023	9089	3739	3756	14316	3743	2854	8154	1.00
2024	9908	4076	4094	15604	4080	3111	8888	1.00
2025	10799	4443	4463	17009	4447	3391	9688	1.00
2026	11771	4843	4864	18540	4847	3696	10560	1.00
2027	12831	5278	5302	20208	5283	4028	11511	1.00

Table 18 Traffic Volume on the Existing Road after Opening of Bypass (Case II)

Year	Cars	Buses	LCV	HCV	MAV	Two Wheelers	PCU/h	V/C Ratio
2009	2720	1119	1124	4284	1120	854	2440	0.81
2010	2965	1220	1225	4670	1221	931	2660	0.89
2011	3232	1329	1335	5090	1331	1015	2899	0.97
2012	3522	1449	1456	5548	1450	1106	3160	1.00
2013	1768	560	618	2570	448	726	1379	0.46
2014	1927	610	674	2802	488	791	1503	0.50
2015	2101	665	734	3054	532	862	1639	0.55
2016	2290	725	801	3329	580	940	1786	0.60
2017	2496	790	873	3628	632	1025	1947	0.65
2018	2720	861	951	3955	689	1117	2122	0.71
2019	2965	938	1037	4311	751	1217	2313	0.77
2020	3232	1023	1130	4699	819	1327	2521	0.84
2021	3523	1115	1232	5122	893	1446	2748	0.92
2022	3840	1215	1343	5583	973	1577	2995	1.00
2023	4185	1325	1464	6085	1061	1718	3265	1.00
2024	4562	1444	1595	6633	1156	1873	3559	1.00
2025	4973	1574	1739	7230	1260	2042	3879	1.00
2026	5420	1715	1895	7880	1373	2225	4228	1.00
2027	5908	1870	2066	8590	1497	2426	4609	1.00

Table 19 Traffic Volume on the Proposed Bypass Road (Case III)

Year	Cars	Buses	LCV	HCV	MAV	Two Wheelers	PCU/h	V/C Ratio
2009	0	0	0	0	0	0	0	0.00
2010	0	0	0	0	0	0	0	0.00
2011	0	0	0	0	0	0	0	0.00
2012	0	0	0	0	0	0	0	0.00
2013	952	560	506	1714	672	128	1061	0.35
2014	1038	610	551	1868	732	140	1156	0.39
2015	1131	665	601	2036	798	152	1261	0.42
2016	1233	725	655	2219	870	166	1374	0.46
2017	1344	790	714	2419	949	181	1498	0.50
2018	1465	861	778	2637	1034	197	1632	0.54
2019	1597	938	848	2874	1127	215	1779	0.59
2020	1740	1023	925	3133	1228	234	1940	0.65
2021	1897	1115	1008	3414	1339	255	2114	0.70
2022	2068	1215	1099	3722	1460	278	2304	0.77
2023	2254	1325	1197	4057	1591	303	2512	0.84
2024	2457	1444	1305	4422	1734	331	2738	0.91
2025	2678	1574	1423	4820	1890	360	2984	1.00
2026	2919	1715	1551	5254	2060	393	3253	1.00
2027	3181	1870	1690	5726	2246	428	3546	1.00

Calculation of Congestion Factors

VOC equations presented in the CRRI study report³ on Updation of Road User Cost Data have been used in this analysis after updating the various VOC inputs based on the WPI analogy described in Section 6.6. The distance and time-related congestion factors are calculated separately and the typical calculations are presented for cars. The Congestion Factors are determined for 'Do Nothing Case' and evaluating the same against the bypass road alternative coupled with comparison of traffic on the existing road after the opening of bypass road.

Distance-Related Congestion Factor

From Table 17, the Volume-Capacity (V/C) ratio for the year 2009 is 0.81. From Table 10, Congestion Factor (CF_D) for distance-related VOC for two-lane road section is determined as follows:

$$\begin{aligned}
 CF_D &= 0.893 + 0.259 \times (V/C) \\
 &= 0.893 + 0.259 \times 0.81 \\
 &= 1.095
 \end{aligned}$$

In accordance with Step 3, this value is multiplied by a factor of 0.8 to obtain the corrected distance-related Congestion Factor.

$$\text{Distance-related Congestion Factor } (CF_D) = 1.0945 \times 0.8 = 0.88$$

However, it is to be noted that whenever the CF_D values are less than 1, it may be taken as 1 as done in this sample exercise. These values are tabulated in Tables 20, 21 and 22.

Time-Related Congestion Factor

From Speed - Flow Equation given in Annex B (*namely, SF-37*) for Two-lane road with Earthen Shoulders,

$$\begin{aligned} V_c &= 85.180 - 0.0170 \times Q \\ &= 85.180 - 0.0170 \times 2440 \\ &= 43.697 \end{aligned}$$

where,

Q is peak traffic flow in PCU for the year in consideration.

For the year 2009, the value Q is 2440 from Table 17. Logically, this value cannot exceed 3000 PCU per hour for two-lane carriageways with earthen shoulders. Therefore, any higher PCU values will be restricted to 3000 PCU only.

Table 20 Distance-Related corrected Congestion Factors for Case I

Year	Cars	Buses	LCV	HCV	MAV	Two Wheelers
2009	1.00	1.36	1.37	1.05	1.76	1.00
2010	1.00	1.42	1.43	1.08	1.85	1.00
2011	1.00	1.49	1.49	1.11	1.96	1.00
2012	1.00	1.52	1.52	1.13	2.00	1.00
2013	1.00	1.52	1.52	1.13	2.00	1.00
2014	1.00	1.52	1.52	1.13	2.00	1.00
2015	1.00	1.52	1.52	1.13	2.00	1.00
2016	1.00	1.52	1.52	1.13	2.00	1.00
2017	1.00	1.52	1.52	1.13	2.00	1.00
2018	1.00	1.52	1.52	1.13	2.00	1.00
2019	1.00	1.52	1.52	1.13	2.00	1.00
2020	1.00	1.52	1.52	1.13	2.00	1.00
2021	1.00	1.52	1.52	1.13	2.00	1.00
2022	1.00	1.52	1.52	1.13	2.00	1.00
2023	1.00	1.52	1.52	1.13	2.00	1.00
2024	1.00	1.52	1.52	1.13	2.00	1.00
2025	1.00	1.52	1.52	1.13	2.00	1.00
2026	1.00	1.52	1.52	1.13	2.00	1.00
2027	1.00	1.52	1.52	1.13	2.00	1.00

Table 21 Distance-Related Corrected Congestion Factors for Case II

Year	Cars	Buses	LCV	HCV	MAV	Two Wheelers
2009	1.00	1.36	1.37	1.05	1.76	1.00
2010	1.00	1.42	1.43	1.08	1.85	1.00
2011	1.00	1.49	1.49	1.11	1.96	1.00
2012	1.00	1.52	1.52	1.13	2.00	1.00
2013	1.00	1.04	1.09	1.00	1.31	1.00
2014	1.00	1.08	1.12	1.00	1.36	1.00
2015	1.00	1.12	1.16	1.00	1.42	1.00
2016	1.00	1.16	1.20	1.00	1.48	1.00
2017	1.00	1.21	1.24	1.00	1.55	1.00
2018	1.00	1.26	1.29	1.01	1.63	1.00
2019	1.00	1.32	1.34	1.04	1.71	1.00
2020	1.00	1.38	1.39	1.06	1.80	1.00
2021	1.00	1.45	1.45	1.09	1.89	1.00
2022	1.00	1.52	1.52	1.13	2.00	1.00
2023	1.00	1.52	1.52	1.13	2.00	1.00
2024	1.00	1.52	1.52	1.13	2.00	1.00
2025	1.00	1.52	1.52	1.13	2.00	1.00
2026	1.00	1.52	1.52	1.13	2.00	1.00
2027	1.00	1.52	1.52	1.13	2.00	1.00

Table 22 Distance-Related Corrected Congestion Factors for Case III

Year	Cars	Buses	LCV	HCV	MAV	Two Wheelers
2009	1.00	1.00	1.00	1.00	1.00	1.00
2010	1.00	1.00	1.00	1.00	1.00	1.00
2011	1.00	1.00	1.00	1.00	1.00	1.00
2012	1.00	1.00	1.00	1.00	1.17	1.00
2013	1.00	1.00	1.00	1.00	1.21	1.00
2014	1.00	1.00	1.03	1.00	1.26	1.00
2015	1.00	1.00	1.06	1.00	1.31	1.00
2016	1.00	1.00	1.09	1.00	1.36	1.00
2017	1.00	1.00	1.12	1.00	1.42	1.00
2018	1.00	1.00	1.16	1.00	1.48	1.00
2019	1.00	1.00	1.19	1.00	1.55	1.00
2020	1.00	1.00	1.24	1.00	1.62	1.00
2021	1.00	1.00	1.28	1.00	1.70	1.00
2022	1.00	1.32	1.33	1.04	1.79	1.00
2023	1.00	1.38	1.39	1.06	1.89	1.00
2024	1.00	1.44	1.45	1.09	2.00	1.00
2025	1.00	1.52	1.52	1.13	2.00	1.00
2026	1.00	1.52	1.52	1.13	2.00	1.00
2027	1.00	1.52	1.52	1.13	2.00	1.00

$$\text{Congestion Factor } (CF_T) = \frac{\text{Intercept of the above Equation (85.180)}}{\text{Speed of Cars that is 43.697}}$$

$$= 1.949$$

The value of CF_T logically is limited to a minimum of 1 and a maximum of 2. In accordance with Step 3, this value is multiplied by a factor 0.8 to obtain the Time-Related Corrected Congestion Factor.

$$\text{Time-Related Congestion Factor } (CF_T) = 1.949 \times 0.8 = 1.559$$

In the case of CF_T , whenever the values are less than 1, it may be taken as 1 as done in this sample exercise. These values are tabulated in Tables 23, 24 and 25.

Table 23 Time-Related Corrected Congestion Factors for Case-I

Year	Cars	Buses	LCV	HCV	MAV	Two Wheelers
2009	1.56	1.12	1.02	1.22	1.22	1.48
2010	1.71	1.16	1.05	1.27	1.28	1.60
2011	1.90	1.21	1.08	1.35	1.35	1.76
2012	2.00	1.27	1.11	1.43	1.44	1.97
2013	2.00	1.34	1.15	1.54	1.55	2.00
2014	2.00	1.43	1.20	1.69	1.69	2.00
2015	2.00	1.54	1.26	1.87	1.88	2.00
2016	2.00	1.68	1.33	2.00	2.00	2.00
2017	2.00	1.86	1.41	2.00	2.00	2.00
2018	2.00	2.00	1.51	2.00	2.00	2.00
2019	2.00	2.00	1.64	2.00	2.00	2.00
2020	2.00	2.00	1.82	2.00	2.00	2.00
2021	2.00	2.00	2.00	2.00	2.00	2.00
2022	2.00	2.00	2.00	2.00	2.00	2.00
2023	2.00	2.00	2.00	2.00	2.00	2.00
2024	2.00	2.00	2.00	2.00	2.00	2.00
2025	2.00	2.00	2.00	2.00	2.00	2.00
2026	2.00	2.00	2.00	2.00	2.00	2.00
2027	2.00	2.00	2.00	2.00	2.00	2.00

Table 24 Time-Related Corrected Congestion Factors for Case II

Year	Cars	Buses	LCV	HCV	MAV	Two Wheelers
2009	1.56	1.12	1.02	1.22	1.22	1.48
2010	1.71	1.16	1.05	1.27	1.28	1.60
2011	1.90	1.21	1.08	1.35	1.35	1.76
2012	2.03	1.27	1.11	1.43	1.44	1.97
2013	1.10	1.00	1.00	1.00	0.99	1.08
2014	1.14	1.00	1.00	1.01	1.01	1.12
2015	1.19	1.00	1.00	1.04	1.04	1.16
2016	1.24	1.01	1.00	1.07	1.07	1.20
2017	1.31	1.04	1.00	1.10	1.10	1.26
2018	1.39	1.06	1.00	1.14	1.14	1.33
2019	1.49	1.10	1.00	1.18	1.19	1.42
2020	1.61	1.14	1.03	1.24	1.24	1.52
2021	1.77	1.18	1.06	1.30	1.30	1.65
2022	1.99	1.23	1.09	1.38	1.38	1.83
2023	2.00	1.30	1.13	1.47	1.48	2.00
2024	2.00	1.37	1.17	1.59	1.60	2.00
2025	2.00	1.47	1.22	1.75	1.76	2.00
2026	2.00	1.58	1.28	1.96	1.97	2.00
2027	2.00	1.74	1.36	2.00	2.00	2.00

Table 25 Time-Related Corrected Congestion Factors for Case III

Year	Cars	Buses	LCV	HCV	MAV	Two Wheelers
2009	1.00	1.00	1.00	1.00	1.00	1.00
2010	1.00	1.00	1.00	1.00	1.00	1.00
2011	1.00	1.00	1.00	1.00	1.00	1.00
2012	1.01	1.00	1.00	1.00	1.00	1.00
2013	1.04	1.00	1.00	1.00	1.00	1.02
2014	1.07	1.00	1.00	1.00	1.00	1.05
2015	1.10	1.00	1.00	1.00	1.00	1.08
2016	1.14	1.00	1.00	1.01	1.01	1.11
2017	1.19	1.00	1.00	1.04	1.04	1.15
2018	1.24	1.01	1.00	1.07	1.07	1.20
2019	1.31	1.04	1.00	1.10	1.10	1.26
2020	1.38	1.06	1.00	1.14	1.14	1.33
2021	1.48	1.10	1.01	1.18	1.18	1.41
2022	1.60	1.13	1.03	1.23	1.24	1.52
2023	1.76	1.18	1.06	1.30	1.30	1.65
2024	1.81	1.23	1.09	1.37	1.38	1.82
2025	1.81	1.29	1.13	1.47	1.47	1.80
2026	1.81	1.37	1.17	1.59	1.59	1.80
2027	1.81	1.37	1.17	1.59	1.69	1.80

Vehicle Operation Cost

Distance-Related and Time-Related Vehicle Operation Costs are calculated using the economic cost data available from Table VOC CARS 26 in Annex D, for uncongested conditions.

Distance-related VOC costs for uncongested condition from Table VOC CARS 26 presented in Annex D are as given below:

	Rs
Fuel Cost	1.07
Spare Parts	0.13
Maintenance Cost	0.07
Tyre Cost	0.14
Engine Oil	0.11
Other Oil	0.03
Grease	0.01
Total	<u>1.56</u>

Distance-Related Vehicle Operation Cost for congested conditions

$$\begin{aligned}
 &= \text{VOC for uncongested condition} \times CF_D \\
 &= \text{Rs } 1.56 \times 1.00 \\
 &= \text{Rs } 1.56
 \end{aligned}$$

Similarly, Time-Related economic costs for uncongested condition from Table VOC CARS 26 are presented below:

	Rs
Fixed Cost	0.85
Depreciation Cost	0.09
Total	<u>= 0.94</u>

Time-Related Vehicle Operation Cost for congested condition

$$\begin{aligned}
 &= \text{VOC for uncongested condition} \times CF_T \\
 &= \text{Rs } 0.94 \times 1.56 \\
 &= \text{Rs } 1.466
 \end{aligned}$$

Total of Distance-Related and Time-Related VOC per Kilometre is

$$\begin{aligned}
 &= \text{Rs } 1.56 + 1.466 \\
 &= \text{Rs } 3.026
 \end{aligned}$$

These values are tabulated in Tables 26, 27 and 28.

Table 26 Vehicle Operation Cost (VOC) for Case I (in Rs per km)

Year	Cars	Buses	LCV	HCV	MAV	Two Wheelers
2009	3.03	8.67	9.48	10.31	21.26	1.16
2010	3.16	9.06	9.79	10.70	22.37	1.20
2011	3.34	9.50	10.15	11.15	23.61	1.24
2012	3.44	9.75	10.41	11.57	24.47	1.30
2013	3.44	9.89	10.61	12.02	25.12	1.31
2014	3.44	10.05	10.84	12.59	25.95	1.31
2015	3.44	10.26	11.13	13.34	27.04	1.31
2016	3.44	10.53	11.46	13.84	27.70	1.31
2017	3.44	10.88	11.88	13.84	27.70	1.31
2018	3.44	11.15	12.39	13.84	27.70	1.31
2019	3.44	11.15	13.05	13.84	27.70	1.31
2020	3.44	11.15	13.91	13.84	27.70	1.31
2021	3.44	11.15	14.82	13.84	27.70	1.31
2022	3.44	11.15	14.82	13.84	27.70	1.31
2023	3.44	11.15	14.82	13.84	27.70	1.31
2024	3.44	11.15	14.82	13.84	27.70	1.31
2025	3.44	11.15	14.82	13.84	27.70	1.31
2026	3.44	11.15	14.82	13.84	27.70	1.31
2027	3.44	11.15	14.82	13.84	27.70	1.31

Table 27 Vehicle Operation Cost (VOC) for Case II (in Rs per km)

Year	Cars	Buses	LCV	HCV	MAV	Two Wheelers
2009	3.03	8.67	9.48	10.31	21.26	1.16
2010	3.16	9.06	9.80	10.70	22.37	1.20
2011	3.34	9.50	10.15	11.15	23.61	1.24
2012	3.47	9.75	10.41	11.57	24.47	1.30
2013	2.60	6.86	8.02	9.14	16.30	1.05
2014	2.63	7.06	8.19	9.22	16.86	1.06
2015	2.68	7.29	8.37	9.32	17.47	1.07
2016	2.73	7.54	8.57	9.44	18.14	1.09
2017	2.79	7.82	8.79	9.57	18.89	1.10
2018	2.86	8.12	9.03	9.79	19.72	1.12
2019	2.96	8.45	9.30	10.10	20.64	1.15
2020	3.07	8.82	9.60	10.45	21.67	1.18
2021	3.23	9.22	9.93	10.86	22.82	1.21
2022	3.43	9.67	10.30	11.34	24.12	1.26
2023	3.44	9.80	10.48	11.73	24.70	1.31
2024	3.44	9.95	10.70	12.21	25.41	1.31
2025	3.44	10.13	10.95	12.85	26.32	1.31
2026	3.44	10.35	11.26	13.69	27.56	1.31
2027	3.44	10.65	11.62	13.86	27.73	1.31

Table 28 Vehicle Operation Cost (VOC) for Case III (in Rs per km)

Year	Cars	Buses	LCV	HCV	MAV	Two Wheelers
2009	2.31	6.35	7.19	8.36	12.70	0.97
2010	2.31	6.35	7.19	8.36	12.70	0.97
2011	2.31	6.35	7.19	8.36	12.70	0.97
2012	2.51	6.56	7.60	8.93	14.91	1.03
2013	2.54	6.59	7.64	8.99	15.32	1.04
2014	2.56	6.61	7.78	9.05	15.78	1.04
2015	2.60	6.64	7.92	9.13	16.28	1.05
2016	2.63	6.67	8.08	9.22	16.83	1.06
2017	2.68	6.71	8.25	9.32	17.44	1.07
2018	2.73	6.75	8.43	9.43	18.11	1.09
2019	2.79	6.80	8.64	9.57	18.86	1.10
2020	2.86	6.85	8.87	9.72	19.68	1.12
2021	2.95	6.91	9.12	9.90	20.60	1.15
2022	3.07	8.51	9.40	10.30	21.62	1.17
2023	3.22	8.89	9.72	10.69	22.77	1.21
2024	3.26	9.30	10.07	11.15	24.12	1.26
2025	3.26	9.79	10.48	11.71	24.67	1.25
2026	3.26	9.94	10.69	12.19	25.37	1.25
2027	3.26	9.94	10.69	12.19	22.79	1.25

It may be noted that the VOC data available in Annex D are for the year 2009. The VOC values for the future years may be obtained based on the WPI which is published periodically by the Ministry of Commerce and Industry⁵. Using the data on estimated traffic volume given in Table 29, the VOC for various alternative proposals can be worked out.

Table 29 Data on Traffic Volume pertaining to Alternative Proposals

Type of Vehicles	Case I Traffic Volume on the Existing Road (in 2009)	Case II Traffic Volume on Existing Road after the opening of Bypass Road (in 2013)	Case III Traffic Volume on the Proposed Bypass (in 2013)
Cars	2720	1768	952
Buses	1120	560	560
HCV	4284	2570	1714
MAV	1120	448	672
LCV	1124	618	506
Two Wheelers	854	726	128

The VOC for cars in the year 2009 for Case I and for 10 km road is:

$$= 3.03 \times 2720 \times 365 \times 10$$

$$= \text{Rs } 300.41 \text{ lakh}$$

These are tabulated for all the three cases in Tables 30, 31 and 32.

**Table 30 Total Vehicle Operating Cost for the Existing Road under
Do Nothing Scenario (Case I)**

(in Rs lakh)

Year	Cars	Buses	LCV	HCV	MAV	2-W	Total VOC
2009	300.41	354.29	388.90	1612.74	869.20	36.27	3561.82
2010	342.27	403.56	437.87	1823.54	996.60	40.70	4044.54
2011	394.51	460.87	494.54	2070.93	1146.73	46.00	4613.59
2012	442.73	515.82	552.82	2342.92	1295.61	52.54	5202.45
2013	482.58	570.06	614.24	2652.13	1449.47	57.63	5826.11
2014	526.01	631.79	684.49	3028.17	1632.01	62.82	6565.29
2015	573.35	702.85	765.49	3498.52	1854.05	68.47	7462.73
2016	624.96	785.89	859.83	3956.55	2070.17	74.63	8372.02
2017	681.20	885.06	971.08	4312.64	2256.48	81.35	9187.81
2018	742.51	989.37	1104.41	4700.77	2459.57	88.67	10085.30
2019	809.34	1078.42	1267.50	5123.84	2680.93	96.65	11056.67
2020	882.18	1175.48	1472.51	5584.99	2922.21	105.35	12142.71
2021	961.57	1281.27	1710.45	6087.64	3185.21	114.83	13340.97
2022	1048.11	1396.58	1864.39	6635.52	3471.88	125.16	14541.66
2023	1142.44	1522.28	2032.19	7232.72	3784.35	136.43	15850.40
2024	1245.26	1659.28	2215.08	7883.67	4124.94	148.71	17276.94
2025	1357.34	1808.62	2414.44	8593.20	4496.19	162.09	18831.87
2026	1479.50	1971.39	2631.74	9366.58	4900.84	176.68	20526.73
2027	1612.65	2148.82	2868.60	10 209.58	5341.92	192.58	22374.14

**Table 31 Total Vehicle Operating Cost for the Existing Road after the
Opening of Bypass Road (Case II)**

(in Rs lakh)

Year	Cars	Buses	LCV	HCV	MAV	2-W	Total VOC
2009	300.41	354.29	388.90	1612.74	869.20	36.27	3561.82
2010	342.27	403.56	438.13	1823.54	996.60	40.70	4044.80
2011	394.51	460.87	494.84	2070.93	1146.73	46.00	4613.89
2012	446.01	515.82	553.16	2342.92	1295.61	52.54	5206.07
2013	167.63	140.03	181.06	857.06	266.62	27.88	1640.29
2014	185.30	157.26	201.39	943.21	300.50	30.68	1818.34
2015	205.28	176.94	224.36	1 039.32	339.41	33.80	2019.10
2016	228.03	199.47	250.36	1 146.88	384.24	37.30	2246.28
2017	254.13	225.33	279.89	1 267.75	436.03	41.26	2504.40
2018	284.41	255.09	313.49	1 413.67	496.09	45.76	2808.52
2019	320.01	289.44	351.87	1 589.32	565.97	50.93	3167.52
2020	362.59	329.18	395.82	1 792.81	647.63	56.94	3584.97
2021	414.74	375.32	446.34	2 030.33	743.51	64.05	4074.29
2022	480.71	429.06	504.63	2 310.10	856.76	72.65	4653.93
2023	524.82	473.81	560.05	2 604.59	956.16	82.22	5201.65
2024	572.05	524.14	622.96	2 957.12	1 072.06	89.62	5837.95
2025	623.53	581.66	695.11	3 390.00	1 210.73	97.69	6598.72
2026	679.65	648.21	778.61	3 938.69	1 381.43	106.48	7533.07
2027	740.82	726.55	876.30	4 344.63	1 515.15	116.06	8319.51

Table 32 Total Vehicle Operating Cost for the Proposed Bypass (Case III)
(in Rs lakh)

Year	Cars	Buses	LCV	HCV	MAV	2-W	Total VOC
2009	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2010	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2011	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2012	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2013	97.00	147.98	155.20	618.26	413.44	5.33	1437.21
2014	106.86	161.92	172.21	679.02	464.08	5.85	1589.93
2015	117.90	177.25	191.10	746.44	521.93	6.43	1761.05
2016	130.31	194.13	212.37	821.43	588.20	7.07	1953.51
2017	144.35	212.75	236.36	905.08	664.31	7.79	2170.63
2018	160.32	233.31	263.50	998.68	751.97	8.60	2416.38
2019	178.65	256.08	294.27	1 103.84	853.24	9.51	2695.59
2020	199.90	281.33	329.26	1 222.55	970.64	10.55	3014.22
2021	224.85	309.42	369.16	1 357.32	1 107.23	11.74	3379.73
2022	254.68	415.08	414.81	1 539.14	1 266.82	13.12	3903.66
2023	291.18	472.52	467.23	1 741.59	1 454.16	14.75	4441.44
2024	321.22	539.36	527.66	1 979.91	1 679.14	16.72	5064.01
2025	350.13	618.86	598.37	2 265.69	1 872.37	18.14	5723.57
2026	381.64	684.53	665.49	2 571.43	2 098.76	19.78	6421.63
2027	415.99	746.13	725.39	2 802.86	2 054.80	21.56	6766.73

Maintenance Cost

The net maintenance cost for each year after accounting for the tax element of 10 percent is indicated in Table 33. For instance, the maintenance cost for the existing road after construction of the bypass can be taken as Rs 2 50 000 x 90/100 x 10 = Rs 22.50 lakh per year (*without tax element*). Similar analogy has been used for the calculation of tax element in the case of construction cost of bypass road and its routine maintenance cost as presented in Table 33.

Calculation of IRR

All the cost benefit data is tabulated as shown in Table 33. The Internal Rate of Return (*IRR*) can be calculated using the standard procedures like trial and error method. Both costs and benefits are discounted at different rates till both are balanced in trial and error method. The IRR obtained in this economic exercise works out to be 29.31 Percent.

Table 33 Statement of Cost and Benefit Analysis of Alternate Proposals (All amounts are in Rs lakh)

Year	Case I: Do Nothing		Case-II: Existing Road after opening of the Bypass		Case-III: Bypass Road		Cost Streams	Benefit Streams	Net Benefits
	Maintenance Cost*	Total VOC for Base case	Maintenance Cost* of the existing road	Total VOC for partial traffic on existing road	Construction* & Maintenance Cost* of Bypass	Total VOC of Bypass			
2009	22.5	3561.82	22.5	3561.82	990	0.00	-990.00	0.00	-990.00
2010	22.5	4044.54	22.5	4044.80	1980	0.00	-1980.00	-0.26	-1980.26
2011	22.5	4613.59	22.5	4613.89	2970	0.00	-2970.00	-0.30	-2970.30
2012	22.5	5202.45	22.5	5206.07	3960	0.00	-3960.00	-3.62	-3963.62
2013	22.5	5826.11	22.5	1640.29	22.5	1437.21	-22.50	2748.61	2726.11
2014	22.5	6565.29	22.5	1818.34	22.5	1589.93	-22.50	3157.02	3134.52
2015	22.5	7462.73	22.5	2019.10	22.5	1761.05	-22.50	3682.58	3660.08
2016	22.5	8372.02	22.5	2246.28	22.5	1953.51	-22.50	4172.23	4149.73
2017	22.5	9187.81	22.5	2504.40	22.5	2170.63	-22.50	4512.78	4490.28
2018	22.5	10085.30	22.5	2808.52	22.5	2416.38	-22.50	4860.40	4837.90
2019	22.5	11056.67	22.5	3167.52	22.5	2695.59	-22.50	5193.56	5171.06
2020	22.5	12142.71	22.5	3584.97	22.5	3014.22	-22.50	5543.52	5521.02
2021	22.5	13340.97	22.5	4074.29	22.5	3379.73	-22.50	5886.95	5864.45
2022	22.5	14541.66	22.5	4653.93	22.5	3903.66	-22.50	5984.07	5961.57
2023	22.5	15850.40	22.5	5201.65	22.5	4441.44	-22.50	6207.31	6184.81
2024	22.5	17276.94	22.5	5837.95	22.5	5064.01	-22.50	6374.98	6352.48
2025	22.5	18831.87	22.5	6598.72	22.5	5723.57	-22.50	6509.58	6487.08
2026	22.5	20526.73	22.5	7533.07	22.5	6421.63	-22.50	6572.03	6549.53
2027	22.5	22374.14	22.5	8319.51	22.5	6766.73	-22.50	7287.89	7265.39
IRR=								29.31%	

Financial Price has been converted into Economic Price by excluding the Tax Components

8 STAGES INVOLVED IN ECONOMIC EVALUATION

8.1 The process of economic evaluation involves a number of stages. The normal stages involved in their sequential order are as follows^{7,13}:

- a) Identification and Definition of the Project
- b) Collection of economic base data
- c) Traffic surveys on existing facility
- d) Selection of policy variables for analysis and decision criteria
- e) Inventory of existing road
- f) Traffic projections
- g) Engineering design of proposed alternative schemes
- h) Estimation of cost of new facility as per all alternatives considered
- i) Traffic analysis on existing and new/proposed roads
- j) Estimation of Road User Benefits
- k) Economic Analysis

8.2 Identification and Definition of the Project

The first step in the process is to clearly identify the project and define its scope. This will help in establishing important factors such as its length, cost, traffic etc.

8.3 Collection of Economic Base Data

In order to carry out the economic analysis of the project, a good amount of economic data is needed. This data will be especially useful in establishing traffic growth rates and forecasting future traffic. Data on past trends of growth of national income namely, Gross National Product (*GNP*), population, motor vehicle population, sale of petroleum products, agricultural production, industrial production, etc. can be particularly valuable.

8.4 Traffic Surveys

Traffic surveys of the following nature are needed:

- a) Traffic census data at intervals of say 20 km, on the existing road, giving average daily traffic (*ADT*) with composition.
- b) Past census data to establish traffic growth rates in the past.
- c) Origin - Destination (*O-D*) surveys in case of a bypass.
- d) Speed and delay studies on the existing alignment.

8.5 Selection of Policy Variables for Analysis and Decision Criteria

The most important policy variable that has to be selected is the design life. It is normal to have highway economic analysis for a design life of 15-20 years. Any value above this range is not likely to influence the analysis because of the effect of discounting. Also, forecasts beyond this range are likely to be erroneous. Thus, for the present, the analysis in India may be done for 15-20 years. If a lesser period is selected, some salvage value will have to be assigned to the facility at the last year of the design period. This may vary from 10 to 20 percent of the initial cost of the facility.

The next point to be selected is the discount rate or the minimum IRR that will be considered acceptable. This factor has been discussed earlier and for Indian conditions, a discount rate of 12 percent per annum is generally acceptable. There are many issues, which need to be addressed regarding shadow pricing of wages, materials and equipment. It is good to arrive at a decision on these points right in the beginning.

8.6 Inventory of the Existing Road

The existing road should be fully surveyed and mapped along with the particulars such as terrain, traffic, road conditions (*geometry, roughness pavement width*) and pavement characteristics (*strength, composition, thickness and deflection*) should also be collected. These will have an influence on the design and specification that will be selected and also on the cost of the alternatives.

8.7 Traffic Projections

Since traffic affects pavement design, design of pavement width and road user costs, its accurate forecast is necessary. This can be done by various methods such as:

- a) Time Series analysis of past traffic count data at the site
- b) Time Series analysis of past growth of motor vehicle population in the region
- c) Time Series analysis of past growth of sale of petroleum products in the region
- d) Correlation between growth of traffic and growth of selected economic indicators.

On the National Highways, the rate of growth is likely to be in the range of 8-12 percent in the coming years.

8.8 Engineering Design of Alternatives

Based on the present condition of the road and present traffic, the future traffic is estimated and various alternatives are visualized to meet the demand. The alternatives might consist of stage-construction strategies or full construction initially.

8.9 Estimation of Cost of New Facility for all Alternatives

For each of the selected alternatives, cost estimates are worked out based on engineering designs. Taxes and subsidies are deducted and shadow pricing is done to arrive at economic costs. The cost of maintenance is also estimated for each of the future years. It has been roughly found that the cost of a road project exclusive of taxes can be taken as 85 - 90 percent of the total cost.

8.10 Traffic Analysis

The analysis of speed-flow is carried out for each year of the design period, knowing the traffic on the road each year. The analysis is carried out for both the existing road and each of the envisaged alternatives. The design should consider widening the pavement to the next stage when the traffic exceeds the design service volume, which may be taken from Table 34. If such widening is not carried out the effect of congestion, described in Clause 6.9 should be added with VOC.

8.11 Estimation of Road User Benefits

Knowing the traffic volume of each class of vehicle, the corresponding speeds, roughness values, pavement widths and geometry (*rise and fall and/or curvature*), the individual components of VOC can be calculated from the VOC Tables presented in Annex C. These VOC tables can be presented by including and excluding passenger time savings for each year of analysis depending on the requirements.

Table 34 Recommended Design Service Volumes⁶

Sl.No.	Road Details	Terrain	Suggested Design Service Volume in PCU/day
1	Single-Lane	Plain	2000 with paved shoulders
		Rolling	1800 with paved shoulders
		Hilly	1600 with paved shoulders
2	Intermediate-Lane	Plain	6000 with earthen shoulders
		Rolling	5700 with earthen shoulders
		Hilly	5200 with earthen shoulders
		Plain	15000 with earthen shoulders 17250 with paved shoulders
3	Two-Lane	Rolling	11000 with earthen shoulders 12650 with paved shoulders
		Hilly	7000 with earthen shoulders 8050 with paved shoulders
4	Four-Lane	Plain	35000 with earthen shoulders 40000 with paved shoulders

8.12 Economic Analysis

The economic analysis is then done for each alternative by comparing with the “do-nothing alternative” and also for the incremental investments from one alternative to the other. If the results are acceptable, as per decision criteria already established, the best alternative is selected. There are ready-made packages for carrying out Economic Analysis. World Bank’s HDM IV (*Version 2.0*) is one such software.

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ANNEX A

(Clause 3.3)

Compound Interest Factors

ANNEX A*(Clause 3.3)***Compound Interest Factors****Table 35 1 Percent Compound Interest Factors (CIF)**

n	CA	PW	SCA	SFF	SPW	CRF
1	1.0100	0.9900	1.0000	1.0000	09901	1.0100
2	1.0201	0.9803	2.0100	0.4975	19704	0.5075
3	1.0303	0.9706	3.0301	0.3300	29410	0.3400
4	1.0406	0.9610	4.0604	0.2463	3.9020	0.2563
5	1.0510	0.9515	5.1010	0.1960	4.8534	0.2060
6	1.0615	0.9420	6.1520	0.1625	5.7955	0.1725
7	1.0721	0.9327	7.2135	0.1386	6.7282	0.1486
8	1.0829	0.9235	8.2857	0.1207	7.6517	0.1307
9	1.0937	0.9146	9.3685	0.1607	8.5660	0.1167
10	1.1046	0.9053	10.4622	0.9056	9.4713	0.1056
11	1.1157	0.8963	11.5668	0.0865	10.3676	0.0965
12	1.1268	0.8874	12.6825	0.0788	11.2551	0.0888
13	1.1381	0.8787	13.8093	0.0724	12.1337	0.0824
14	1.1495	0.8700	14.9474	0.0669	13.0037	0.0769
15	1.1610	0.8613	16.0969	0.0621	13.8651	0.0721
16	1.1726	0.8528	17.2579	0.0579	14.7179	0.0679
17	1.1843	0.8444	18.4304	0.0543	15.5623	0.0643
18	1.1961	0.8360	19.6147	0.0510	16.3983	0.0610
19	1.2081	0.8277	20.8109	0.0481	17.2260	0.0581
20	1.2202	0.8195	22.0190	0.0454	18.0456	0.0554
21	1.2324	0.8114	23.2392	0.0430	18.8570	0.0530
22	1.2447	0.8034	24.4716	0.0409	19.6604	0.0509
23	1.2572	0.7954	25.7163	0.0389	20.4558	0.0489
24	1.2697	0.7876	26.9735	0.0371	21.2434	0.0471
25	1.2824	0.7798	28.2432	0.0354	22.0232	0.0454
26	1.2953	0.7720	29.5256	0.0339	22.7952	0.0439
27	1.3082	0.7644	30.8209	0.0324	23.5596	0.0424
28	1.3213	0.7568	32.1291	0.0311	24.3164	0.0411
29	1.3345	0.7493	33.4504	0.0299	25.0658	0.0399
30	1.3478	0.7419	34.7849	0.0287	25.8077	0.0387
31	1.3613	0.7346	36.1327	0.0277	26.5423	0.0377
32	1.3749	0.7273	37.4941	0.0267	27.2696	0.0367
33	1.3887	0.7201	38.8690	0.0257	27.9897	0.0357
34	1.4026	0.7130	40.2577	0.0248	28.7027	0.0348
35	1.4166	0.7059	41.6603	0.0240	29.4086	0.0340
36	1.4308	0.6989	43.0769	0.0232	30.1075	0.0332
37	1.4451	0.6920	44.5075	0.0225	30.7995	0.0325
38	1.4595	0.6852	45.9527	0.0218	31.4847	0.0318
39	1.4741	0.6784	47.4123	0.0211	32.1630	0.0311
40	1.4889	0.6717	48.8864	0.0205	32.8347	0.0305
45	1.5648	0.6391	56.4811	0.0177	36.0945	0.0277
50	1.6446	0.6080	64.4632	0.0155	39.1961	0.0255

Table 36 2 Percent Compound Interest Factors (CIF)

n	CA	PW	SCA	SFF	SPW	CRF
1	1.0200	0.9804	1.0000	1.0000	0.9804	1.0200
2	1.0404	0.9612	2.0200	0.4951	1.9416	0.5151
3	1.0612	0.9423	3.0604	0.3268	2.8839	0.3468
4	1.0824	0.9238	4.1216	0.2426	3.8077	0.2626
5	1.1041	0.9057	5.2040	0.1922	4.7135	0.2122
6	1.1262	0.8880	6.3081	0.1585	5.6014	0.1785
7	1.1487	0.8706	7.4343	0.1345	6.4720	0.1545
8	1.1717	0.8535	8.5830	0.1165	7.3255	0.1365
9	1.1951	0.8368	9.7546	0.1025	8.1622	0.2225
10	1.2190	0.8203	10.9497	0.0913	8.9826	0.1113
11	1.2434	0.8043	12.1687	0.0822	9.7868	0.1022
12	1.2682	0.7885	13.4121	0.0746	10.5753	0.0946
13	1.2936	0.7730	14.6803	0.0681	11.3484	0.0881
14	1.3195	0.7579	15.9739	0.2626	12.1062	0.0826
15	1.3459	0.7430	17.2934	0.0578	12.8493	0.0778
16	1.3728	0.7284	18.6393	0.0537	13.5777	0.0737
17	1.4002	0.7142	20.0121	0.0500	14.2919	0.0700
18	1.4282	0.7002	21.4123	0.0467	14.9920	0.0667
19	1.4568	0.6864	22.8406	0.0438	15.6785	0.0638
20	1.4859	0.6730	24.2974	0.0412	16.3514	0.0612
21	1.5157	0.6598	25.7833	0.0388	17.0112	0.0588
22	1.5460	0.6468	27.2990	0.0366	17.6580	0.0566
23	1.5769	0.6342	28.8450	0.0347	18.2922	0.0547
24	1.6084	0.6217	30.4219	0.0329	18.9139	0.0529
25	1.6406	0.6095	32.0303	0.0312	19.5235	0.0512
26	1.6734	0.5976	33.6709	0.0297	20.1210	0.0497
27	1.7069	0.5859	35.3443	0.0283	20.7069	0.0483
28	1.7410	0.5744	37.0512	0.0270	21.2813	0.0470
29	1.7758	0.5631	38.7922	0.0258	21.8444	0.0458
30	1.8114	0.5521	40.5681	0.0247	22.3965	0.0447
31	1.8476	0.5412	42.3794	0.0236	22.9377	0.0436
32	1.7745	0.5306	44.2270	0.0226	23.4683	0.0426
33	1.9222	0.5202	46.1110	0.0217	23.9886	0.0417
34	1.9607	0.5100	48.0338	0.0208	24.4986	0.0408
35	1.9996	0.5000	49.9945	0.0200	24.9986	0.0400
36	2.0933	0.4902	51.9944	0.0192	25.4888	0.0392
37	2.0807	0.4806	54.0333	0.0185	25.9695	0.0385
38	2.1223	0.4712	56.1149	0.0178	26.4406	0.0378
39	2.1647	0.4619	58.2372	0.0172	26.9026	0.0372
40	2.2080	0.4529	60.4020	0.0166	27.3555	0.0366
45	2.4379	0.4102	71.8927	0.0139	29.4902	0.0339
50	2.6916	0.3715	84.5794	0.0118	31.4236	0.0318

Table 37 3 Percent Compound Interest Factors (CIF)

n	CA	PW	SCA	SFF	SPW	CRF
1	1.0300	0.9709	1.0000	1.0000	0.9709	1.0300
2	1.0609	0.9426	2.0300	0.4926	1.9135	0.5226
3	1.0927	0.9151	3.0909	0.3235	2.8286	0.3535
4	1.1255	0.8885	4.1836	0.2390	3.7171	0.2690
5	1.1593	0.8626	5.3091	0.1884	4.5797	0.2184
6	1.1941	0.9375	6.4684	0.1546	5.4172	0.1846
7	1.2299	0.8131	7.6625	0.1305	6.2303	0.1605
8	1.2668	0.7894	8.8923	0.1125	7.0197	0.1425
9	1.3048	0.7664	10.1591	0.0984	7.7861	0.1284
10	1.3439	0.7441	11.4639	0.0872	8.5302	0.1172
11	1.3842	0.7224	12.8078	0.0781	9.2526	0.1081
12	1.4258	0.7014	14.1920	0.0705	9.9540	0.1005
13	1.4685	0.6810	15.6178	0.0640	10.6350	0.0940
14	1.5126	0.6611	17.0863	0.0585	11.2961	0.0885
15	1.5580	0.6419	18.5989	0.0538	11.9379	0.0838
16	1.6047	0.6232	20.1569	0.0496	12.5611	0.0796
17	1.6528	0.6050	21.7616	0.0460	13.1661	0.0760
18	1.7024	0.5874	23.4144	0.0427	13.7535	0.0727
19	1.7535	0.5703	25.1169	0.0398	14.3238	0.0698
20	1.8061	0.5537	26.8704	0.0372	14.8775	0.0672
21	1.8603	0.5375	28.6765	0.0349	15.4150	0.0649
22	1.9161	0.5219	30.5368	0.0327	15.9369	0.0627
23	1.9736	0.5067	32.4529	0.0308	16.4436	0.0608
24	2.0328	0.4919	34.4265	0.0290	16.9355	0.0590
25	2.0938	0.4776	36.4593	0.0274	17.4131	0.0574
26	2.1566	0.4637	38.5530	0.0259	17.8768	0.0559
27	2.2213	0.4502	40.7096	0.0246	18.3270	0.0546
28	2.2879	0.4371	42.9309	0.0233	18.7641	0.0533
29	2.3566	0.4243	45.2189	0.0221	19.1885	0.0521
30	2.4273	0.4120	47.5754	0.0210	19.6004	0.0510
31	2.5000	0.4900	50.0028	0.0200	20.0004	0.0500
32	2.5751	0.3883	52.5028	0.0190	20.3888	0.0490
33	2.6523	0.3770	55.0778	0.0182	20.7658	0.0482
34	2.7319	0.3660	57.7302	0.0173	21.1318	0.0473
35	2.8139	0.3554	60.4621	0.0165	21.4872	0.0465
36	2.8983	0.3450	63.2759	0.0158	21.8323	0.0458
37	2.9852	0.3350	66.1742	0.0151	22.1672	0.0451
38	3.0748	0.3252	69.1594	0.0145	22.4925	0.0445
39	3.1670	0.3158	72.2342	0.0138	22.8082	0.0438
40	3.2620	0.3066	75.4012	0.0133	23.1148	0.0433
45	3.7816	0.2644	92.7199	0.0108	24.5187	0.0408
50	4.3839	0.2281	112.7969	0.0089	25.7298	0.0389

Table 38 4 Percent Compound Interest Factors (CIF)

n	CA	PW	SCA	SFF	SPW	CRF
1	1.0400	0.9615	1.0000	1.0000	0.9615	1.0040
2	1.0816	0.9246	2.0400	0.4902	1.8861	0.5302
3	1.1249	0.8890	3.1216	0.3203	2.7751	0.3603
4	1.1699	0.8548	4.2465	0.2355	3.6299	0.2755
5	1.2167	0.8219	5.4163	0.1846	4.4518	0.2246
6	1.2653	0.7903	6.6330	0.1508	5.2451	0.1908
7	1.3159	0.7599	7.8983	0.1266	6.0021	0.1666
8	1.3686	0.7307	9.2142	0.1085	6.7327	0.1485
9	1.4233	0.7026	10.5828	0.0945	7.4353	0.1345
10	1.4802	0.6756	12.0061	0.0833	8.1109	0.1233
11	1.5395	0.6496	13.4864	0.0741	8.7605	0.1141
12	1.6010	0.6246	15.0258	0.0666	9.3851	0.1066
13	1.6651	0.6006	16.6268	0.0601	9.9856	0.1001
14	1.7317	0.5775	18.2919	0.0547	10.5631	0.0947
15	1.8009	0.5553	20.0236	0.0499	11.1184	0.0899
16	1.8730	0.5339	21.8245	0.0458	11.6523	0.0858
17	1.9479	0.5134	23.6975	0.0422	12.1657	0.0822
18	2.0258	0.4936	25.6454	0.0390	12.6593	0.0790
19	2.0168	0.4746	27.6712	0.0361	13.1339	0.0761
20	2.1911	0.4546	29.7781	0.0336	13.5903	0.0736
21	2.2788	0.4388	31.9692	0.0313	14.0292	0.0713
22	2.3699	0.4220	34.2480	0.0292	14.4511	0.0692
23	2.4647	0.4057	36.6179	0.0273	14.8568	0.0673
24	2.5633	0.3901	39.0826	0.0256	15.2470	0.0656
25	2.6658	0.3751	41.6459	0.0240	15.6221	0.0640
26	2.7725	0.3607	44.3117	0.0226	15.9828	0.0626
27	2.8834	0.3468	47.0842	0.0212	16.3296	0.0612
28	2.9987	0.3335	49.9676	0.0200	16.6631	0.0600
29	3.1187	0.3207	52.9663	0.0189	16.9837	0.0589
30	3.2434	0.3083	56.0849	0.0178	17.2920	0.0578
31	3.3731	0.2965	59.3283	0.0169	17.5885	0.0569
32	3.5081	0.2851	62.7015	0.0159	17.8736	0.0559
33	3.6484	0.2741	66.2095	0.0151	18.1476	0.0551
34	3.7943	0.2636	69.8579	0.0143	18.4112	0.0543
35	3.9641	0.2534	73.6522	0.0136	18.6646	0.0536
36	4.1039	0.2437	77.5983	0.0129	18.9083	0.0522
37	4.2681	0.2343	81.7022	0.0122	19.1426	0.0522
38	4.4388	0.2253	85.9703	0.0116	19.3679	0.0516
39	4.6164	0.2166	90.4092	0.0111	19.5845	0.0511
40	4.8010	0.2083	95.0255	0.0105	19.7928	0.0505
45	5.8412	0.1771	121.0294	0.0083	20.7200	0.0483
50	7.1067	0.1407	152.6671	0.0066	21.4822	0.0466

Table 39 5 Percent Compound Interest Factors (CIF)

n	CA	PW	SCA	SFF	SPW	CRF
1	1.0500	0.9524	1.0000	1.0000	0.9524	1.0500
2	1.1025	0.9070	2.0500	0.4878	1.8594	0.5378
3	1.1576	0.8638	3.1525	0.3172	4.7232	0.3672
4	1.2155	0.8227	4.3101	0.2320	3.5460	0.2820
5	1.2763	0.7835	5.5256	0.1810	4.3295	0.2310
6	1.3401	0.7462	6.8019	0.1470	5.0757	0.1970
7	1.4071	0.7107	8.1420	0.1228	5.7864	0.1728
8	1.4775	0.6768	9.5491	0.1047	6.4632	0.1547
9	1.5513	0.6446	11.0266	0.0907	7.1078	0.1407
10	1.6289	0.6139	12.5779	0.0795	7.7217	0.1295
11	1.7103	0.5847	14.2068	0.0704	8.3064	0.1204
12	1.7959	0.5568	15.9171	0.0628	8.8633	0.1128
13	1.8856	0.5303	17.7130	0.0565	9.3936	0.1065
14	1.9799	0.5051	19.5986	0.0510	9.8986	0.1010
15	2.0789	0.4810	21.5786	0.0463	10.3797	0.0963
16	2.1829	0.4581	23.6575	0.0423	10.8378	0.0923
17	2.2920	0.4363	25.8404	0.0387	11.2741	0.0887
18	2.4066	0.4155	28.1324	0.0355	11.6896	0.0855
19	2.5270	0.3957	30.5390	0.0327	12.0853	0.0827
20	2.6533	0.3769	33.0660	0.0302	12.4622	0.0802
21	2.7860	0.3589	35.7193	0.0280	12.8212	0.0780
22	2.9253	0.3419	38.5052	0.0260	13.1360	0.0760
23	3.0715	0.3256	41.4305	0.0241	13.4886	0.0741
24	3.2251	0.3101	44.5020	0.0225	13.7986	0.0725
25	3.3864	0.2953	47.7271	0.0210	14.0939	0.0710
26	3.5557	0.2812	51.1135	0.0196	14.3752	0.0696
27	3.7335	0.2678	54.6691	0.0183	14.6430	0.0683
28	3.9201	0.2551	58.4026	0.0171	14.8981	0.0671
29	4.1161	0.2429	62.3227	0.0160	15.1411	0.0660
30	4.3219	0.2314	66.4388	0.0151	15.3725	0.0660
31	4.5380	0.2204	70.7608	0.0141	15.5928	0.0651
32	4.7649	0.2099	75.2988	0.0133	15.8027	0.0641
33	5.0032	0.1999	80.0638	0.0125	16.0025	0.0633
34	5.2533	0.1904	85.0670	0.0118	16.1929	0.0625
35	5.5160	0.1813	90.3203	0.0111	16.3742	0.0611
36	5.7918	0.1727	95.8363	0.0101	16.5469	0.0604
37	6.0814	0.1644	101.6281	0.0098	16.7113	0.0598
38	6.3855	0.1566	107.7095	0.0093	16.8679	0.0593
39	6.7048	0.1491	114.0950	0.0088	17.0170	0.0588
40	7.0400	0.1420	120.7998	0.0083	17.1591	0.0583
45	8.9850	0.1113	159.7002	0.0063	17.7741	0.0563
50	11.4674	0.0872	209.3480	0.0048	18.2559	0.0548

Table 40 6 Percent Compound Interest Factors (CIF)

n	CA	PW	SCA	SFF	SPW	CRF
1	1.0600	0.9434	1.0000	1.0000	0.9434	1.0600
2	1.1236	0.8900	3.0600	0.4854	1.8334	0.5454
3	1.1910	0.8396	3.1836	0.3141	2.6730	0.3741
4	1.2625	0.7921	4.3746	0.2286	3.4651	0.2886
5	1.3382	0.7473	5.6371	0.1774	4.2124	0.2374
6	1.4185	0.7050	6.9753	0.1434	4.9173	0.2034
7	1.5036	0.6651	8.3938	0.1191	5.5824	0.2034
8	1.5938	0.6274	9.8975	0.1010	6.2098	0.1791
9	1.6895	0.5919	11.4913	0.0870	6.8017	0.1610
10	1.7908	0.5584	13.1808	0.0759	7.3601	0.1470
11	1.8983	0.5268	14.9716	0.0668	7.8869	0.1268
12	2.0122	0.4970	16.8600	0.0593	8.3838	0.1193
13	2.1329	0.4688	18.8821	0.0530	8.8527	0.1130
14	2.2609	0.4423	21.0151	0.0476	9.2950	0.1076
15	2.3966	0.4173	23.2760	0.0430	9.7122	0.1030
16	2.5404	0.3936	25.6725	0.0390	10.1059	0.0990
17	2.6928	0.3714	28.2129	0.0354	10.4773	0.0954
18	2.8543	0.3503	30.9057	0.0324	10.8276	0.0924
19	3.0256	0.3505	33.7600	0.0296	11.1581	0.0896
20	3.2071	0.3118	36.7856	0.0272	11.4699	0.0872
21	3.3096	0.2942	39.9927	0.0250	11.7641	0.0850
22	3.6035	0.2775	43.3923	0.0230	12.0416	0.0830
23	3.8197	0.2618	46.3395	0.0213	12.3034	0.0813
24	4.0489	0.2470	50.8156	0.0197	12.5504	0.0797
25	4.2919	0.2330	54.8645	0.0182	12.7834	0.0782
26	4.5494	0.2198	59.1564	0.0169	13.0032	0.0769
27	4.8223	0.2074	63.7058	0.0157	13.2105	0.0757
28	5.1117	0.1956	68.5281	0.0146	13.4062	0.0746
29	5.4184	0.1846	73.6398	0.0136	13.5907	0.0736
30	5.7435	0.1741	79.0582	0.0126	13.7648	0.0726
31	6.0881	0.1643	84.8017	0.0118	13.9291	0.0718
32	6.4534	0.1550	90.8898	0.0110	14.0840	0.0710
33	6.8406	0.1462	97.3432	0.0103	14.2302	0.0703
34	7.2510	0.1379	104.1838	0.0096	14.3681	0.0696
35	7.6861	0.1301	111.4348	0.0090	14.4982	0.0690
36	8.1473	0.1227	119.1209	0.0084	14.6210	0.0684
37	8.6361	0.1158	127.2681	0.0079	14.7368	0.0679
38	9.1543	0.1092	135.9042	0.0074	14.8460	0.0674
35	9.7033	0.1030	145.0585	0.0069	14.9491	0.0669
40	10.2857	0.0972	154.7620	0.0065	15.0463	0.0665
45	13.7646	0.0727	212.7435	0.0047	15.4558	0.0647
50	18.4202	0.0543	290.3359	0.0034	15.7619	0.0634

Table 41 7 Percent Compound Interest Factors (CIF)

n	CA	PW	SCA	SFF	SPW	CRF
1	1.0700	0.9346	1.0000	1.0000	0.9346	1.0700
2	1.1449	0.8734	2.0700	0.4831	1.8080	0.5531
3	1.2250	0.8163	3.2149	0.3111	2.6243	0.3811
4	1.3108	0.7629	4.4399	0.2252	3.3872	0.2952
5	1.4026	0.7130	5.7507	0.1739	4.1002	0.2439
6	1.5007	0.6663	7.1533	0.1398	4.7665	0.2098
7	1.6058	0.6228	8.6540	0.1156	5.3893	0.1856
8	1.7182	0.5820	10.2598	0.0975	5.9713	0.1675
9	1.8385	0.5439	11.9780	0.0835	6.5152	0.1535
10	1.9672	0.5083	13.8164	0.0724	7.0236	0.1424
11	2.1049	0.4751	15.7836	0.0634	7.4987	0.1334
12	2.2522	0.4440	17.8885	0.0559	7.9227	0.1259
13	2.4098	0.4150	20.1406	0.0497	8.3577	0.1197
14	2.5785	0.3878	22.5505	0.0443	8.7455	0.1143
15	2.7590	0.3624	25.1290	0.0398	9.1079	0.1098
16	2.9522	0.3387	27.8881	0.0359	9.4466	0.1059
17	3.1588	0.3166	30.8042	0.0324	9.7632	0.1024
18	3.3799	0.2959	33.9990	0.0294	10.0591	0.0994
19	3.6165	0.2765	37.3790	0.0268	10.3356	0.0968
20	3.8697	0.2584	40.9955	0.0244	10.5940	0.0944
21	4.1406	0.2415	44.8652	0.0223	10.8355	0.0923
22	4.4304	0.2257	49.0057	0.0204	11.0612	0.0904
23	4.7405	0.2109	53.4361	0.0187	11.2722	0.0887
24	5.0724	0.1971	58.1767	0.0172	11.4693	0.0872
25	5.4274	0.1842	63.2490	0.0158	11.6536	0.0858
26	5.8074	0.1722	68.6765	0.0146	11.8258	0.0846
27	6.2139	0.1609	74.4838	0.0134	11.9867	0.0834
28	6.6488	0.1504	80.6977	0.0124	12.1371	0.0824
29	7.1143	0.1406	87.3465	0.0114	12.2777	0.0814
30	7.6123	0.1314	94.4608	0.0106	12.4090	0.0806
31	8.1451	0.1228	102.0730	0.0098	12.5318	0.0798
32	8.7153	0.1147	110.2182	0.0091	12.6466	0.0791
33	9.3253	0.1072	118.9334	0.0084	12.7538	0.0784
34	9.9781	0.1002	128.2588	0.0078	12.8540	0.0778
35	10.6766	0.0937	138.2369	0.0072	12.9477	0.0772
36	11.4239	0.0875	148.9135	0.0067	13.0352	0.0767
37	12.2236	0.0818	160.3374	0.0062	13.1170	0.0762
38	13.0793	0.0765	172.5610	0.0058	13.1935	0.0758
39	13.9948	0.0715	185.6403	0.0054	13.2649	0.0754
40	14.9745	0.0668	199.6351	0.0050	13.3317	0.0750
45	21.0025	0.0476	285.7493	0.0035	13.6055	0.0735
50	29.4570	0.0339	406.5289	0.0025	13.8007	0.0725

Table 42 8 Percent Compound Interest Factors (CIF)

n	CA	PW	SCA	SFF	SPW	CRF
1	1.0800	0.9259	1.0000	1.0000	0.9259	1.0800
2	1.1664	0.8573	2.0800	0.4808	1.7833	0.5608
3	1.2597	0.7938	3.2464	0.3080	2.5771	0.3880
4	1.3605	0.7350	4.5061	0.2219	3.3121	0.3019
5	1.4693	0.6806	5.8666	0.1705	3.9927	0.2505
6	1.5869	0.6302	7.3359	0.1363	4.6229	0.2163
7	1.7138	0.5835	8.9228	0.1121	5.2064	0.1921
8	1.8509	0.5403	10.6366	0.0940	5.7466	0.1740
9	1.9990	0.5002	12.4876	0.0801	5.2469	0.1601
10	2.1589	0.4632	14.4866	0.0690	6.7101	0.1490
11	2.3316	0.4289	16.6455	0.0600	7.1390	0.1401
12	2.5182	0.3971	18.9771	0.0527	7.5361	0.1327
13	2.7196	0.3677	21.4953	0.0465	7.9038	0.1265
14	2.9372	0.3405	24.2149	0.0413	8.2442	0.1213
15	3.1722	0.3152	27.1521	0.0368	8.5595	0.1168
16	3.4259	0.2919	30.3243	0.0330	8.8514	0.1130
17	3.7000	0.2703	33.7502	0.0296	9.1216	0.1096
18	3.9960	0.2502	37.4502	0.0267	9.3719	0.1067
19	4.3157	0.2317	41.4463	0.0241	9.6036	0.1041
20	4.6610	0.2145	45.7620	0.0219	9.8181	0.1019
21	5.0338	0.1987	50.4229	0.0198	10.0168	0.0998
22	5.4365	0.1839	55.4568	0.0180	10.2009	0.0980
23	5.8715	0.1703	60.8933	0.0164	10.3711	0.0964
24	6.3412	0.1577	66.7648	0.0150	10.5288	0.0950
25	6.8485	0.1460	73.1059	0.0137	10.6748	0.0937
26	7.3964	0.1352	79.9544	0.0125	10.8100	0.0925
27	7.9881	0.1252	87.3508	0.0114	10.9352	0.0914
28	8.6271	0.1159	95.3388	0.0105	11.0511	0.0905
29	9.3173	0.1073	103.9659	0.0096	11.1584	0.0896
30	10.0627	0.0994	113.2832	0.0088	11.2578	0.0888
31	10.8677	0.0920	123.3459	0.0081	11.3498	0.0881
32	11.7371	0.0852	134.2135	0.0075	11.4250	0.0875
33	12.6760	0.0789	145.9506	0.0069	11.5139	0.0869
34	13.6901	0.0730	158.6267	0.0063	11.5869	0.0863
35	14.7853	0.0676	172.3168	0.0058	11.6546	0.0858
36	15.9682	0.0626	187.1021	0.0053	11.7172	0.0853
37	17.2456	0.0580	203.0703	0.0049	11.7752	0.0849
38	18.6253	0.0537	220.3159	0.0045	11.8289	0.0849
39	20.1153	0.0497	238.9412	0.0042	11.8786	0.0842
40	21.7245	0.0460	259.0565	0.0039	11.9246	0.0839
45	31.9204	0.0313	386.5056	0.0026	12.1084	0.0826
50	46.9016	0.0213	573.7702	0.0017	12.2335	0.0817

Table 43 9 Percent Compound Interest Factors (CIF)

n	CA	PW	SCA	SFF	SPW	CRF
1	1.0900	0.9174	1.0000	1.0000	0.9174	1.0900
2	1.1881	0.8417	2.0900	0.4785	1.7591	0.5685
3	0.2950	0.7722	3.2781	0.3051	2.5313	0.3951
4	1.4116	0.7084	4.5731	0.2187	3.2397	0.0387
5	1.5386	0.6499	5.9847	0.1671	3.8897	0.2571
6	1.6771	0.5963	7.5233	0.1329	4.4859	0.2229
7	1.8280	0.5470	9.2004	0.1087	5.0330	0.1987
8	1.9926	0.5019	11.0285	0.0907	5.5348	0.1807
9	2.1719	0.4604	13.0210	0.0768	5.9952	0.1668
10	2.3674	0.4224	15.1929	0.0658	6.4177	0.1558
11	2.5804	0.3875	17.5603	0.0569	6.8052	0.1469
12	2.8127	0.3555	20.1407	0.0497	7.1067	0.1397
13	3.0658	0.3262	22.9534	0.0436	7.4869	0.1336
14	3.3417	0.2992	26.0192	0.0384	7.7862	0.1284
15	3.6425	0.2745	29.3609	0.0341	8.0607	0.1241
16	3.9703	0.2519	33.0034	0.0303	8.3126	0.1203
17	4.3276	0.2311	36.9737	0.0270	3.8436	0.1170
18	4.7171	0.2120	41.3013	0.0242	8.7556	0.1142
19	5.1417	0.1945	46.0185	0.0217	8.9501	0.1117
20	5.6044	0.1784	51.1601	0.0195	9.1285	0.1095
21	6.1088	0.1637	56.7645	0.0176	9.2922	0.1076
22	6.6586	0.1502	62.8733	0.0159	9.4224	0.1059
23	7.2579	0.1378	69.5319	0.0144	9.5802	0.1044
24	7.9111	0.1264	76.7898	0.0130	9.7066	0.1030
25	8.6231	0.1160	84.7009	0.0118	9.8226	0.1018
26	9.3992	0.1064	93.3240	0.0107	9.9290	0.1007
27	10.2451	0.0976	102.7231	0.0097	10.0266	0.0997
28	11.1671	0.0895	112.9682	0.0089	10.1161	0.0989
29	12.1722	0.0822	124.1354	0.0081	10.1983	0.0981
30	13.2677	0.0754	136.3075	0.0073	10.2737	0.0973
31	14.4618	0.0691	149.5752	0.0067	10.3428	0.0967
32	15.7633	0.0634	164.0370	0.0061	10.4062	0.0961
33	17.1820	0.0582	179.8003	0.0056	10.4644	0.0956
34	18.7284	0.0534	196.9823	0.0051	10.5178	0.0951
35	20.4140	0.0490	215.7108	0.0046	10.5668	0.0946
36	22.2512	0.0449	236.1247	0.0042	10.6118	0.0942
37	24.2538	0.0412	258.3759	0.0039	10.6530	0.0939
38	26.4367	0.0378	282.6298	0.0035	10.6908	0.0935
39	28.8160	0.0347	309.0665	0.0032	10.7255	0.0932
40	31.4094	0.0318	337.8824	0.0030	10.7574	0.0930
45	48.3273	0.0207	525.8587	0.0019	10.8812	0.0919
50	74.3575	0.0134	815.0836	0.0012	10.9617	0.0912

Table 44 10 Percent Compound Interest Factors (CIF)

n	CA	PW	SCA	SFF	SPW	CRF
1	1.1000	0.9091	1.0000	1.0000	0.9091	1.1000
2	1.2100	0.8264	2.1000	0.4762	1.7355	0.5762
3	1.3310	0.7513	3.3100	0.3021	2.4869	0.4021
4	1.4641	0.6830	4.6410	0.2155	3.1699	0.3155
5	1.6105	0.6209	6.1051	0.1638	3.7908	0.2638
6	1.7716	0.5645	7.7156	0.1296	4.3553	0.2296
7	1.9487	0.5132	9.4872	0.1054	4.8684	0.2054
8	2.1436	0.4665	11.4359	0.0874	5.3349	0.1874
9	2.3579	0.4241	13.5795	0.0736	5.7590	0.1736
10	2.5937	0.3855	15.9374	0.0627	6.1446	0.1627
11	2.8531	0.3505	18.5312	0.0540	6.4951	0.1540
12	3.1384	0.3186	21.3843	0.0468	6.8137	0.1468
13	3.4523	0.2897	24.5227	0.0408	7.1034	0.1408
14	3.7975	0.2633	27.9750	0.0357	7.3667	0.1357
15	4.1772	0.2394	31.7725	0.0315	7.6061	0.1315
16	4.5950	0.2176	35.9497	0.0278	7.8237	0.1278
17	5.0545	0.1978	40.5447	0.0247	8.0216	0.1247
18	5.5599	0.1799	45.5992	0.0219	8.2014	0.1219
19	6.1159	0.1635	51.1591	0.0195	8.3649	0.1195
20	6.7275	0.1486	57.2750	0.0175	8.5136	0.1175
21	7.4002	0.1351	64.0025	0.0156	8.6487	0.1156
22	8.1403	0.1228	71.4027	0.0140	8.7715	0.1140
23	8.9543	0.1117	79.5430	0.0126	8.8832	0.1126
24	9.8497	0.1015	88.4973	0.0113	8.9847	0.1113
25	10.8347	0.0923	98.3471	0.0102	9.0770	0.1102
26	11.9182	0.0839	109.1818	0.0092	9.1609	0.1092
27	13.1100	0.0763	121.0999	0.0083	9.2372	0.1083
28	14.4210	0.0693	134.2099	0.0075	9.3066	0.1075
29	15.8631	0.0630	148.6309	0.0067	9.3996	0.1067
30	17.4494	0.0573	164.4940	0.0061	9.4269	0.1061
31	19.1943	0.0521	181.9434	0.0055	9.4790	0.1055
32	21.1138	0.0474	201.1378	0.0050	9.5264	0.1050
33	23.2252	0.0431	222.2515	0.0045	9.5694	0.1045
34	25.5427	0.0391	245.4767	0.0041	9.6086	0.1041
35	28.1024	0.0356	271.0244	0.0037	9.6442	0.1037
36	30.9127	0.0323	299.1268	0.0033	9.6765	0.1033
37	34.0039	0.0294	330.0395	0.0030	9.7059	0.1030
38	37.4043	0.0267	364.0434	0.0027	9.7327	0.1027
39	41.1448	0.0243	401.4478	0.0025	9.7570	0.1025
40	45.2593	0.0221	442.5926	0.0023	9.7791	0.1023
45	72.8904	0.0137	718.9048	0.0014	9.8628	0.1014
50	117.3909	0.0085	1,163.9085	0.0009	9.9148	0.1009

Table 45 12 Percent Compound Interest Factors (CIF)

n	CA	PW	SCA	SFF	SPW	CRF
1	1.1200	0.8929	1.0000	1.0000	0.8929	1.1200
2	1.2544	0.7972	2.1200	0.4717	1.6901	0.5917
3	1.4049	0.7118	3.3744	0.2963	2.4018	0.4163
4	1.5735	0.6355	4.7793	0.2092	3.0374	0.3292
5	1.7623	0.5674	5.3529	0.1574	3.6048	0.2774
6	1.9738	0.5066	8.1152	0.1232	4.1114	0.2432
7	2.2107	0.4523	10.0890	0.0991	4.5638	0.2191
8	2.4760	0.4039	12.1997	0.0813	4.9676	0.2013
9	2.7731	0.3606	14.7757	0.0677	5.3283	0.1877
10	3.1058	0.3220	17.5487	0.0570	5.6502	0.1770
11	3.4785	0.2875	20.6546	0.0484	5.9377	0.1684
12	3.8960	0.2567	24.1331	0.0414	6.1944	0.1614
13	4.3635	0.2292	28.0291	0.0357	6.4236	0.1557
14	4.8871	0.2046	32.3926	0.0309	6.6282	0.1509
15	5.4736	0.1827	37.2797	0.0268	6.8109	0.1468
16	6.1304	0.1631	42.7533	0.0234	6.9740	0.1434
17	6.8660	0.1456	48.8837	0.0205	7.1196	0.1405
18	7.6900	0.1300	55.7497	0.0179	7.2497	0.1379
19	8.6128	0.1161	63.4397	0.0158	7.3658	0.1358
20	9.6463	0.1037	72.0524	0.0139	7.4694	0.1339
21	10.8038	0.0926	81.6987	0.0122	7.5620	0.1322
22	12.1003	0.0826	92.5026	0.0108	7.6446	0.1308
23	13.5523	0.0738	104.6029	0.0096	7.7184	0.1296
24	15.1786	0.0659	118.1552	0.0085	7.7843	0.1285
25	17.0001	0.0588	133.3339	0.0075	7.8431	0.1275
26	19.0401	0.0525	150.3339	0.0067	7.8957	0.1267
27	21.3249	0.0469	169.3740	0.0059	7.9426	0.1259
28	23.8839	0.0419	190.6989	0.0052	7.9844	0.1252
29	26.7499	0.0374	214.5828	0.0047	8.0218	0.1247
30	29.9599	0.0334	241.3327	0.0041	8.0552	0.1241
31	33.5551	0.0298	271.2926	0.0037	8.0850	0.1237
32	37.5817	0.0266	304.8477	0.0033	8.1116	0.1233
33	42.0915	0.0238	342.4295	0.0029	8.1354	0.1229
34	47.1425	0.0212	384.5210	0.0026	8.1565	0.1226
35	52.7996	0.0189	431.6635	0.0023	8.1755	0.1223
36	59.1356	0.0169	484.4631	0.0021	8.1924	0.1221
37	66.2318	0.0151	543.5987	0.0018	8.2075	0.1218
38	74.1797	0.0135	609.8305	0.0016	8.2210	0.1216
39	83.0812	0.0120	684.0102	0.0015	8.2330	0.1215
40	93.0510	0.0107	767.0914	0.0013	8.2438	0.1213
41	104.2171	0.0096	860.1424	0.0012	8.2533	0.1212
42	116.7231	0.0086	964.3595	0.0010	8.2619	0.1210
43	130.7299	0.0076	1,081.0826	0.0009	8.2696	0.1209
44	146.4175	0.0068	1,211.8125	0.0008	8.2764	0.1208
45	163.9876	0.0061	1,358.2300	0.0007	8.2825	0.1207
50	289.0022	0.0035	2,400.0183	0.0004	8.3045	0.1204

Table 46 15 Percent Compound Interest Factors (CIF)

n	CA	PW	SCA	SFF	SPW	CRF
1	1.1500	0.8696	1.0000	1.0000	0.8696	1.1500
2	1.3225	0.7561	2.1500	0.4651	1.6257	0.6151
3	1.5209	0.6575	3.4725	0.2880	2.2832	0.4380
4	1.7490	0.5718	4.9934	0.2003	2.8550	0.3503
5	2.0144	0.4972	6.7424	0.1483	3.3522	0.2983
6	2.1331	0.4323	8.7537	0.1142	3.7845	0.2642
7	2.6600	0.3759	11.0668	0.0904	4.1604	0.2404
8	3.0590	0.3269	13.7268	0.0729	4.4873	0.2229
9	3.5179	0.2843	16.7858	0.0596	4.7716	0.2096
10	4.0456	0.2472	20.3037	0.0493	5.0188	0.1993
11	4.6524	0.2149	24.3493	0.0411	5.2337	0.1911
12	5.3503	0.1869	29.0017	0.3445	5.4206	0.1845
13	6.1528	0.1625	34.3519	0.0291	5.5832	0.1791
14	7.0757	0.1413	40.5047	0.0247	5.7245	0.1747
15	8.1371	0.1229	47.5804	0.0210	5.8474	0.1710
16	9.3576	0.1069	55.7175	0.0179	5.9542	0.1679
17	10.7613	0.0929	65.0751	0.0154	6.0472	0.1654
18	12.3755	0.0808	75.8364	0.0132	6.1280	0.1632
19	14.2318	0.0703	88.2118	0.0113	6.1982	0.1613
20	16.3665	0.0611	102.4436	0.0098	6.2594	0.1598
21	18.8215	0.0531	118.8101	0.0084	6.3125	0.1584
22	21.6447	0.0462	137.6316	0.0073	6.3587	0.1573
23	24.8915	0.0402	159.2764	0.0063	6.3989	0.1563
24	28.6252	0.0349	184.1678	0.0054	6.4338	0.1554
25	32.9190	0.0304	212.7930	0.0047	6.4642	0.1547
26	37.8568	0.0264	245.7120	0.0041	6.4906	0.1541
27	43.5353	0.0230	283.5689	0.0035	6.5136	0.1535
28	50.0656	0.0200	327.1041	0.0031	6.5335	0.1531
29	57.5755	0.0174	377.1697	0.0023	6.5509	0.1527
30	66.2118	0.0151	434.7452	0.0023	6.5660	0.1523
31	76.1435	0.0131	500.9569	0.0020	6.5791	0.1520
32	87.5651	0.0114	577.1005	0.0017	6.5905	0.1517
33	100.6998	0.0099	664.6655	0.0015	6.6004	0.1515
34	115.8048	0.0086	765.3654	0.0013	6.6091	0.1513
35	133.1755	0.0075	881.1702	0.0011	6.6166	0.1511
36	153.1519	0.0065	1,014.3457	0.0010	6.6231	0.1510
37	176.1246	0.0057	1,167.4975	0.0009	6.6288	0.1509
38	202.5433	0.0049	1,343.6222	0.0007	6.6338	0.1507
39	232.9248	0.0043	1,546.1655	0.0006	6.6380	0.1506
40	267.8635	0.0037	1,779.0903	0.0006	6.6418	0.1506
41	308.0431	0.0032	2,046.9539	0.0005	6.6450	0.1505
42	354.2495	0.0028	2,354.9969	0.0004	6.6478	0.1504
43	407.3870	0.0025	2,709.2466	0.0004	6.6503	0.1504
44	468.4950	0.0021	3,116.6334	0.0003	6.6524	0.1503
45	538.7693	0.0019	3,585.1285	0.0003	6.6543	0.1503
50	1,083.6574	0.0009	7,217.7163	0.0001	6.6605	0.1501

ANNEX B

(Clause 6.5)

Speed - Flow Equations: 2001

ANNEX B

(Clause 6.5)

Table 47 Speed-Flow Equations: 2001

Road Type	Plain Terrain	Rolling Terrain	Hilly Terrain
Single-Lane	$SF1:V_C = 61.748 - 0.0562*Q$ $SF2:V_{BU} = 51.744 - 0.0478*Q$ $SF3:V_{LCV} = 51.937 - 0.0510*Q$ $SF4:V_{HCV} = 47.283 - 0.0373*Q$ $SF5:V_{MAV} = 39.718 - 0.0313*Q$ $SF6:V_{TWO} = 42.666 - 0.0300*Q$	$SF7:V_C = 58.45 - 0.0562*Q$ $SF8:V_{BU} = 49.081 - 0.0478*Q$ $SF9:V_{LCV} = 47.598 - 0.0510*Q$ $SF10:V_{HCV} = 43.158 - 0.0373*Q$ $SF11:V_{MAV} = 36.253 - 0.0313*Q$ $SF12:V_{TWO} = 41.413 - 0.0300*Q$	$SF13:V_C = 49.643 - 0.0562*Q$ $SF14:V_{BU} = 41.615 - 0.0478*Q$ $SF15:V_{LCV} = 37.169 - 0.0510*Q$ $SF16:V_{HCV} = 33.063 - 0.0373*Q$ $SF17:V_{MAV} = 27.773 - 0.0313*Q$ $SF18:V_{TWO} = 37.736 - 0.0300*Q$
Intermediate-Lane with Earthen Shoulders	$SF19:V_C = 63.249 - 0.0210*Q$ $SF20:V_{BU} = 56.222 - 0.0130*Q$ $SF21:V_{LCV} = 56.282 - 0.0195*Q$ $SF22:V_{HCV} = 52.350 - 0.0186*Q$ $SF23:V_{MAV} = 43.974 - 0.0156*Q$ $SF24:V_{TWO} = 47.849 - 0.0109*Q$	$SF25:V_C = 64.145 - 0.0210*Q$ $SF26:V_{BU} = 52.272 - 0.0130*Q$ $SF27:V_{LCV} = 51.878 - 0.0195*Q$ $SF28:V_{HCV} = 48.171 - 0.0186*Q$ $SF29:V_{MAV} = 40.464 - 0.0156*Q$ $SF30:V_{TWO} = 46.554 - 0.0109*Q$	$SF31:V_C = 51.835 - 0.0210*Q$ $SF32:V_{BU} = 42.817 - 0.0130*Q$ $SF33:V_{LCV} = 41.293 - 0.0195*Q$ $SF34:V_{HCV} = 37.944 - 0.0186*Q$ $SF35:V_{MAV} = 31.873 - 0.0156*Q$ $SF36:V_{TWO} = 42.752 - 0.0109*Q$
Two-Lane with Earthen Shoulders	$SF37:V_C = 85.180 - 0.0170*Q$ $SF38:V_{BU} = 67.457 - 0.0079*Q$ $SF39:V_{LCV} = 67.400 - 0.0060*Q$ $SF40:V_{HCV} = 59.295 - 0.0083*Q$ $SF41:V_{MAV} = 49.808 - 0.0070*Q$ $SF42:V_{TWO} = 55.172 - 0.0105*Q$	$SF43:V_C = 82.693 - 0.0175*Q$ $SF44:V_{BU} = 63.009 - 0.0136*Q$ $SF45:V_{LCV} = 64.953 - 0.0137*Q$ $SF46:V_{HCV} = 56.940 - 0.0120*Q$ $SF47:V_{MAV} = 47.830 - 0.0101*Q$ $SF48:V_{TWO} = 49.884 - 0.0105*Q$	$SF49:V_C = 72.726 - 0.0175*Q$ $SF50:V_{BU} = 52.835 - 0.0136*Q$ $SF51:V_{LCV} = 52.948 - 0.0137*Q$ $SF52:V_{HCV} = 46.188 - 0.0120*Q$ $SF53:V_{MAV} = 38.798 - 0.0101*Q$ $SF54:V_{TWO} = 46.228 - 0.0105*Q$
Two-Lane with Paved Shoulders	$SF55:V_C = 88.148 - 0.0079*Q$ $SF56:V_{BU} = 70.116 - 0.0071*Q$ $SF57:V_{LCV} = 70.118 - 0.0071*Q$ $SF58:V_{HCV} = 61.631 - 0.0062*Q$ $SF59:V_{MAV} = 51.770 - 0.0052*Q$ $SF60:V_{TWO} = 55.243 - 0.0073*Q$	$SF61:V_C = 84.763 - 0.0079*Q$ $SF62:V_{BU} = 67.327 - 0.0071*Q$ $SF63:V_{LCV} = 67.193 - 0.0071*Q$ $SF64:V_{HCV} = 59.019 - 0.0062*Q$ $SF65:V_{MAV} = 49.576 - 0.0052*Q$ $SF66:V_{TWO} = 54.194 - 0.0073*Q$	$SF67:V_C = 75.703 - 0.0079*Q$ $SF68:V_{BU} = 59.507 - 0.0071*Q$ $SF69:V_{LCV} = 58.623 - 0.0071*Q$ $SF70:V_{HCV} = 51.223 - 0.0062*Q$ $SF71:V_{MAV} = 43.027 - 0.0052*Q$ $SF72:V_{TWO} = 50.802 - 0.0073*Q$
Four-Lane with Earthen Shoulders	$SF73:V_C = 85.140 - 0.0091*Q$ $SF74:V_{BU} = 70.883 - 0.0069*Q$ $SF75:V_{LCV} = 70.744 - 0.0080*Q$ $SF76:V_{HCV} = 62.411 - 0.0111*Q$ $SF77:V_{MAV} = 52.425 - 0.0093*Q$ $SF78:V_{TWO} = 58.675 - 0.0075*Q$	$SF79:V_C = 82.687 - 0.0091*Q$ $SF80:V_{BU} = 66.498 - 0.0069*Q$ $SF81:V_{LCV} = 65.693 - 0.0080*Q$ $SF82:V_{HCV} = 57.940 - 0.0111*Q$ $SF83:V_{MAV} = 48.670 - 0.0093*Q$ $SF84:V_{TWO} = 57.274 - 0.0075*Q$	$SF85:V_C = 72.443 - 0.0091*Q$ $SF86:V_{BU} = 56.000 - 0.0069*Q$ $SF87:V_{LCV} = 53.551 - 0.0080*Q$ $SF88:V_{HCV} = 46.999 - 0.0111*Q$ $SF89:V_{MAV} = 39.479 - 0.0093*Q$ $SF90:V_{TWO} = 53.161 - 0.0075*Q$

Road Type	Plain Terrain	Rolling Terrain	Hilly Terrain
Four-Lane with Paved Shoulders	SF91: $V_C = 92.766 - 0.0075*Q$	SF97: $V_C = 89.204 - .0075*Q$	SF103: $V_C = 79.669 - 0.0075*Q$
	SF92: $V_{BU} = 75.011 - 0.0073*Q$	SF98: $V_{BU} = 70.705 - .0073*Q$	SF104: $V_{BU} = 60.395 - 0.0073*Q$
	SF93: $V_{LCV} = 70.514 - 0.0085*Q$	SF99: $V_{LCV} = 65.802 - .0085*Q$	SF105: $V_{LCV} = 54.476 - 0.0085*Q$
	SF94: $V_{HCV} = 62.530 - .0075*Q$	SF100: $V_{HCV} = 58.325 - .0075*Q$	SF106: $V_{HCV} = 48.036 - 0.0075*Q$
	SF95: $V_{MAV} = 52.525 - .0063*Q$	SF101: $V_{MAV} = 48.993 - .0063*Q$	SF107: $V_{MAV} = 40.350 - 0.0063*Q$
	SF96: $V_{TWO} = 56.612 - .0069*Q$	SF102: $V_{TWO} = 55.312 - .0069*Q$	SF108: $V_{TWO} = 51.494 - 0.0069*Q$

where,

- Q = Volume of traffic in PCU/h
 V_C = Speed of Cars in km/h
 V_{BU} = Speed of Buses in km/h
 V_{LCV} = Speed of Light Commercial Vehicles in km/h
 V_{HCV} = Speed of Two-Axle Heavy Commercial Vehicles in km/h
 V_{MAV} = Speed of Multi-Axle Heavy Commercial Vehicles in km/h
 V_{TWO} = Speed of Two Wheelers in km/h
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ANNEX C

(Clause 6.6)

Vehicle Operating Cost (VOC) Equations for Individual Components of VOC

ANNEX C

(Clause 6.6)

VOC Equations for Individual Components of VOC**Table 48 VOC Equations for Cars**

Sl.No.	VOC Component	Equation
1	Fuel Consumption	$FC = 21.85 + (504.15/V) + 0.004957 V^2 + 0.000652^* RG + 1.0684^* RS - 0.3684^* FL$
2	a) Spare Parts Cost (Including Taxes)	$\frac{SP}{NP}_{(IT)} = 0.0018^* (RG - 2000)^* 10^{-5}$
	b) Spare Parts Cost (Excluding Taxes)	$\frac{SP}{NP}_{(ET)} = 0.0018^* (RG - 2000)^* 10^{-5}$
3	Maintenance Labour	$LC = 0.5498 SP_{(IT)}$
4	Tyre Life	$TL = 68771 - 147.9^* RF - 26.72^* (RG/W)$
5	Engine Oil	$EOL = 1.7048 + 0.03319^* RF + 0.0005241^* (RG/W)$
6	Other Oil	$OL = 1.631 + 0.05167^* RF + 0.001867^* (RG/W)$
7	Grease	$G = 2.816 + 0.2007 RF$
8	Speed Equation (based on Type of Carriageway)	
	a) Single Lane	$V_{CARS}^{SL} = 59.86 - (0.6236^* RF) - 0.002589^* (RG - 2000)$
	b) Intermediate Lane	$V_{CARS}^{IL} = 65.91 - (0.6575^* RF) - 0.00201^* (RG - 2000)$
	c) Two-Lane	$V_{CARS}^{2L} = 73.14 - (0.711^* RF) - 0.00171^* (RG - 2000)$
	d) Four-Lane	$V_{CARS}^{4L} = 78.58 - (0.764^* RF) - 0.00183^* (RG - 2000)$
9	Utilisation	$UPD = 6.187^* V$
10	Fixed Cost a) Including Taxes	$FC_{(IT)} = \frac{370.14}{UPD}$

	b) Excluding Taxes	$FC_{(ET)} = \frac{365.56}{UPD}$
11	Depreciation Cost a) Including Taxes	$DC_{(IT)} = \frac{70.85}{UPD}$
	b) Excluding Taxes	$DC_{(ET)} = \frac{39.57}{UPD}$
12	Value of Passenger Time [VOT] (Work and Non-work trips considered together) a) Primary Routes	$PT_{TR} = \frac{227.82}{V}$
	b) Secondary Routes	$PT_{SE} = \frac{169.49}{V}$

Table 49 VOC Equations for Two Wheelers

Sl.No.	VOC Component	Equation
1	Fuel Consumption	$FC = 3.38 + (549.57/V) + 0.00436 \cdot V^2 + 0.000196 \cdot RG + 0.4552 \cdot RS - 0.3386 \cdot FL$
2	a) Spare Parts Cost (Including Taxes)	$\frac{SP_{(IT)}}{NP_{(IT)}} = (-55.879 + 0.024 \cdot RG) \cdot 10^{-5}$
	b) Spare Parts Cost (Excluding Taxes)	$\frac{SP_{(ET)}}{NP_{(ET)}} = (-55.879 + 0.024 \cdot RG) \cdot 10^{-5}$
3	Maintenance Labour	$LC = 0.5498 \cdot SP_{(IT)}$
4	Tyre Life	$TL = 47340 - 101.8 \cdot RF - 18.39 \cdot RG/W$
5	Engine Oil	$EOL = 0.405 + 0.007899 \cdot RF + 0.000125 \cdot (RG/W)$

6	Speed Equation (based on type of carriageway)	
	a) Single-Lane	$V_{2W}^{SL} = 40.7 - (0.4305 \cdot RF) - 0.00193 \cdot (RG - 2000)$
	b) Intermediate Lane	$V_{2W}^{IL} = 45.28 - (0.4515 \cdot RF) - 0.00138 \cdot (RG - 2000)$
	c) Two-Lane	$V_{2W}^{2L} = 45.93 - (0.4465 \cdot RF) - 0.00107 \cdot (RG - 2000)$
	d) Four-Lane	$V_{2W}^{4L} = 48.65 - (0.4729 \cdot RF) - 0.00113 \cdot (RG - 2000)$
7	Utilisation	$UPD = 2.119 \cdot V$
8	Fixed Cost	
	a. Including Taxes	$FC_{(IT)} = \frac{22.97}{UPD}$
	b. Excluding Taxes	$FC_{(ET)} = \frac{22.47}{UPD}$
9	Depreciation Cost	
	a. Including Taxes	$DC_{(IT)} = \frac{5.40}{UPD}$
	b. Excluding Taxes	$DC_{(ET)} = \frac{3.93}{UPD}$
10	Value of Passenger Time [VOT] (<i>Work and Non-work trips considered together</i>)	
	(a) Primary Routes	$PT_{TR} = \frac{45.10}{V}$
	(b) Secondary Routes	$PT_{SE} = \frac{31.62}{V}$

Table 50 VOC Equations for Buses

Sl.No.	VOC Component	Equation
1	Fuel Consumption	$FC = 32.97 + (3904.64/V) + 0.0207 \cdot V^2 + 0.0012 \cdot RG + 3.3281 \cdot RF - 1.7769 \cdot FL$
2	Spare Parts Cost (Including Taxes)	$\frac{SP}{NP}_{(IT)} = e[-10.44 + 0.007373 \cdot RF + 0.0000723 \cdot RG + 1.925 \cdot W]$
	Spare Parts Cost (Excluding Taxes)	$\frac{SP}{NP}_{(ET)} = e[-10.44 + 0.007373 \cdot RF + 0.0000723 \cdot RG + 1.925 \cdot W]$
3	Maintenance Labour	$LC = 0.5498 \cdot SP_{(IT)}$
4	Tyre Life	$TL = 38519 - 389.52 \cdot RF - 1.32 \cdot RG + 983.829 \cdot W$
5	Engine Oil	$EOL = 1.146 + 0.00398 \cdot RF + 0.0021 \cdot (RG/W)$
6	Other Oil	$OL = 3.3201 + 0.002889 \cdot RF + 0.0008217 \cdot RG - 0.3295 \cdot W$
7	Grease	$G = 4.992 + 0.03376 \cdot RF + 0.3634 \cdot W$
8	Speed Equation (based on type of carriageway)	
	a) Single-Lane	$V_{BUS}^{SL} = 47.25 - (0.3698 \cdot RF) - 0.00165 \cdot (RG - 2000)$
	b) Intermediate Lane	$V_{BUS}^{IL} = 52.65 - (0.4031 \cdot RF) - 0.00123 \cdot (RG - 2000)$
	c) Two-Lane	$V_{BUS}^{2L} = 54.23 - (0.4111 \cdot RF) - 0.00098 \cdot (RG - 2000)$
	d) Four-Lane	$V_{BUS}^{4L} = 60.32 - (0.4573 \cdot RF) - 0.00109 \cdot (RG - 2000)$
9	Utilisation of Buses	$UPD = 28.07 + 15.1476 \cdot V$
10	Fixed Costs a) Including Taxes	$F_{(IT)} = \frac{907.95}{UPD}$
	b) Excluding Taxes	$F_{(ET)} = \frac{495.90}{UPD}$

11	Depreciation Cost a) Including Taxes	$DC_{(IT)} = \frac{228.23}{UPD}$
	b) Excluding Taxes	$DC_{(ET)} = \frac{141.80}{UPD}$
12	Wages of Crew	$CW = \frac{938.67}{UPD}$
13	Value of Passenger Time [VOT] (Work and Non-work trips considered together) (a) Primary Routes	$PT_{TR} = \frac{14080.00}{UPD}$
	(b) Secondary Routes	$PT_{SE} = \frac{5067.80}{UPD}$

Table 51 VOC Equations for Light Commercial Vehicles (LCV)

Sl.No.	VOC Component	Equation
1	Fuel Consumption	$FC = 21.28 + (1615.327 / V) + 0.0245 * V^2 + 0.001524 * RG + 5.377 * RF - 0.8268 * FL$
2	(a) Spare parts cost (Including Taxes)	$\frac{SP_{(IT)}}{NP_{(IT)}} = e^{-10.9278 + 0.000141 * RG + 3.493 * W}$
	(b) Spare parts cost (Excluding Taxes)	$\frac{SP_{(ET)}}{NP_{(ET)}} = e^{-10.9278 + 0.000141 * RG + 3.493 * W}$
3	Maintenance Labour	$LC = 0.3692 * SP(IT)$
4	Tyre Life	$TL = 22382 + 3817 * W - 375.3 * RF - 1.037 * RG$
5	Engine Oil	$EOL = 1.0635 + 0.0257 * RF + 0.000171 * (RG/W)$

6	Other Oil	$OL = 2.0415 + 0.0001058 * RG$
7	Grease	$G = 0.3661 + 0.0283 * RF + 0.000251 * RG$
8	Speed Equation (based on type of carriageway)	
	a) Single-Lane	$V_{LCV}^{SL} = 49.87 - (0.4447 * RF) - 0.00088 * (RG - 2000)$
	b) Intermediate Lane	$V_{LCV}^{IL} = 53.70 - (0.4788 * RF) - 0.00095 * (RG - 2000)$
	c) Two-Lane	$V_{LCV}^{2L} = 57.41 - (0.5119 * RF) - 0.00102 * (RG - 2000)$
	d) Four-Lane	$V_{LCV}^{4L} = 62.85 - (0.5604 * RF) - 0.00111 * (RG - 2000)$
9	Utilisation	$UPD = 28.773 + 2.181 * V$
10	Fixed Costs a) Including Taxes	$F_{(IT)} = \frac{576.08}{UPD}$
	b) Excluding Taxes	$F_{(ET)} = \frac{502.64}{UPD}$
11	Depreciation Cost a) Including Taxes	$DC_{(IT)} = \frac{120.49}{UPD}$
	b) Excluding Taxes	$DC_{(ET)} = \frac{83.96}{UPD}$
12	Wages of Crew	$CW = \frac{359.49}{UPD}$
13	Commodity Value i) Primary Routes	$CM_{TRV} = \frac{49.55}{UPD}$
	ii) Secondary Routes	$CM_{SRV} = \frac{44.94}{UPD}$

Table 52 VOC Equations for Two Axle Heavy Commercial Vehicles (HCV)

Sl.No.	VOC Component	Equation
1	Fuel Consumption	$FC = 44.08 + (3904.64/V) + 0.0207 \cdot V^2 + 0.0012 \cdot RG + 3.3281 \cdot RS - 1.7769 \cdot FL$
2	(a) Spare parts cost (Including Taxes)	$\frac{SP}{NP}_{(IT)} = e[-10.3677 + 0.0001413 \cdot RG + 3.4930/W]$
	(b) Spare parts cost (Excluding Taxes)	$\frac{SP}{NP}_{(ET)} = e[-10.3677 + 0.0001413 \cdot RG + 3.4930/W]$
3	Maintenance Labour	$LC = 0.3692 \cdot SP_{(IT)}$
4	Tyre Life	$TL = 24662 + 4205 \cdot W - 413.6 \cdot RF - 1.142 \cdot RG$
5	Engine Oil	$EOL = 1.73 + 0.042 \cdot RF + 0.0003 \cdot (RG/W)$
6	Other Oil	$OL = 5.1037 + 0.0002646 \cdot RG$
7	Grease	$G = 0.9153 + 0.0707 \cdot RF + 0.000627 \cdot RG$
8	Speed Equation (based on type of carriageway)	
	a) Single-Lane	$V_{HCV-2}^{SL} = 45.56 - (0.4062 \cdot RF) - 0.00081 \cdot (RG - 2000)$
	b) Intermediate Lane	$V_{HCV-2}^{IL} = 50.11 - (0.4468 \cdot RF) - 0.00089 \cdot (RG - 2000)$
	c) Two-Lane	$V_{HCV-2}^{2L} = 53.32 - (0.4755 \cdot RF) - 0.00094 \cdot (RG - 2000)$
	d) Four-Lane	$V_{HCV-2}^{4L} = 55.53 - (0.4952 \cdot RF) - 0.00098 \cdot (RG - 2000)$
9	Utilisation	$UPD = 68.12 + 5.1637 \cdot V$
10	Fixed Costs	
	a) Including Taxes	$F_{(IT)} = \frac{733.90}{UPD}$
	b) Excluding Taxes	$F_{(IT)} = \frac{641.86}{UPD}$

11	Depreciation Cost	
	a) Including Taxes	$DC_{(IT)} = \frac{178.33}{UPD}$
	b) Excluding Taxes	$DC_{(ET)} = \frac{107.53}{UPD}$
12	Wages of Crew	$CW = \frac{599.15}{UPD}$
13	Commodity Value	
	i) Primary Routes	$CMV_{TR} = \frac{151.91}{UPD}$
	ii) Secondary Routes	$CMV_{SR} = \frac{126.94}{UPD}$

Table 53 VOC Equations for Multi Axle Heavy Commercial Vehicles (MAV)

Sl.No.	VOC Component	Equation
1	Fuel Consumption	$FC = 141.0 + (2695.79/V) + 0.0517 \cdot V^2 + 0.0035 \cdot RG + 17.75 \cdot RS - 5.40 \cdot FL$
2	(a) Spare parts cost (including taxes)	$\frac{SP}{NP}_{(IT)} = e^{-10.9278 + 0.0001413RG + 3.4930/W}$
	(b) Spare parts cost (excluding taxes)	$\frac{SP}{NP}_{(ET)} = e^{-10.9278 + 0.0001413RG + 3.4930/W}$
3	Maintenance Labour	$LC = 0.3692 \cdot SP_{(IT)}$
4	Tyre Life	$TL = 23726 + 4046 \cdot W - 398 \cdot RF - 1.0099 \cdot RG$
5	Engine Oil	$EOL = 2.354 + 0.05701 \cdot RF + 0.0038 \cdot (RG/W)$
6	Other Oil	$OL = 5.1037 + 0.0002646 \cdot RG$
7	Grease	$G = 0.9153 + 0.0707 \cdot RF + 0.000627 \cdot RG$

8	Speed Equation (based on type of carriageway)	
	a) Single-Lane	$V_{MAV}^{SL} = 38.27 - (0.3412 * RF) - 0.00068 * (RG - 2000)$
	b) Intermediate Lane	$V_{MAV}^{IL} = 42.01 - (0.3753 * RF) - 0.00074 * (RG - 2000)$
	c) Two-Lane	$V_{MAV}^{2L} = 44.79 - (0.3994 * RF) - 0.00079 * (RG - 2000)$
	d) Four-Lane	$V_{MAV}^{4L} = 46.65 - (0.4159 * RF) - 0.00083 * (RG - 2000)$
9	Utilisation	$UPD = 70.38 + 5.3349 * V$
10	Fixed Costs	
	(a) Including Taxes	$F_{(IT)} = \frac{1024.51}{UPD}$
	(b) Excluding Taxes	$F_{(IT)} = \frac{858.90}{UPD}$
11	Depreciation Cost	
	a) Including Taxes	$DC_{(IT)} = \frac{295.72}{UPD}$
	b) Excluding Taxes	$DC_{(ET)} = \frac{165.65}{UPD}$
12	Wages of Crew	$CW = \frac{718.98}{UPD}$
13	Commodity Value	$CMV_{TR} = \frac{284.22}{UPD}$

ANNEX D

(Clause 6.6)

Vehicle Operating Cost Tables

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ANNEX D*(Clause 6.9)***Vehicle Operation Cost Tables****Notes on the Use of Tables**

The VOC tables presented in this annex for each vehicle type are based on Updated Road User Cost study⁴ and also based on March, 2009 price levels⁵. These can be used for future years by applying WPI values periodically published by the Ministry of Commerce and Industry⁵. Economic costs exclude taxes whereas financial costs include taxes. The VOC costs presented in this annex are for free traffic flow conditions. For congested conditions, they should be increased by using appropriate factors recommended in clause 6.9. The unit prices of different VOC inputs are presented in Table 54. To arrive at the VOC figures for intermediate values of Roughness and Rise/Fall values (*that is, other than those presented in Annex D*), the VOC values presented in Annex D needs to be interpolated accordingly.

Table 54 Current Vehicle Operating Cost Inputs (All Prices in Rs)

Sl.No.	VOC Inputs	Price without Taxes	Price with Taxes
A. Cost of New Vehicles			
1	Two Wheelers	35 375	48 625
2	Cars		
	i) Small Cars	279 200	390 600
	ii) Big Cars	499 150	779 800
3	Buses	721 050	1 160 500
4	Light Commercial Vehicles	426 900	612 675
5	Two Axle Heavy Commercial Vehicles	746 800	1 106 350
6	Multi-Axle Heavy Commercial Vehicles	842 325	1 503 625
B. Cost of Petroleum Products			
1	Petrol (<i>per litre</i>)	18.55	45.85
2	Diesel (<i>per litre</i>)	18.20	35.10
3	Engine Oil (<i>per litre</i>)	56.70	116.0
4	Other Oil (<i>per litre</i>)	117.40	237.25
5	Grease (<i>per kg</i>)	49.90	106.10
C. Cost of New Tyres			
1	Two Wheelers	650	800
2	Cars	1 930	2 930
3	Buses	6 525	8 500
4	LCV	3 020	4 960
5	HCV - (<i>For Both Two and Multi Axle</i>)	6 120	8 810

VOC Tables for Cars

(Clause 6.9)

Table VOC CARS 1
Economic Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.95	0.13	0.11	0.03	0.01	0.03	0.02	0.99	0.11	2.38	2.83	5.23
5	0.99	0.14	0.12	0.03	0.02	0.03	0.02	1.04	0.11	2.50	2.99	5.50
10	1.03	0.14	0.13	0.04	0.02	0.03	0.02	1.10	0.12	2.63	3.16	5.81
15	1.08	0.14	0.14	0.04	0.03	0.03	0.02	1.17	0.13	2.78	3.36	6.14
20	1.13	0.14	0.15	0.04	0.03	0.03	0.02	1.25	0.13	2.93	3.58	6.52
25	1.19	0.14	0.16	0.05	0.04	0.03	0.02	1.33	0.14	3.10	3.83	6.95
30	1.25	0.15	0.17	0.05	0.04	0.03	0.02	1.44	0.16	3.29	4.12	7.43
35	1.31	0.15	0.18	0.05	0.05	0.03	0.02	1.55	0.17	3.51	4.46	7.98
40	1.38	0.15	0.19	0.06	0.05	0.03	0.02	1.69	0.18	3.75	4.85	8.62
45	1.45	0.15	0.20	0.06	0.06	0.03	0.02	1.86	0.20	4.03	5.33	9.37
50	1.54	0.16	0.21	0.06	0.06	0.03	0.02	2.06	0.22	4.35	5.91	10.28

Table VOC CARS 2
Economic Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.94	0.15	0.12	0.04	0.01	0.06	0.03	1.03	0.11	2.50	2.96	5.49
5	0.98	0.16	0.13	0.04	0.02	0.06	0.03	1.09	0.12	2.63	3.13	5.79
10	1.03	0.16	0.14	0.04	0.02	0.06	0.03	1.16	0.13	2.77	3.32	6.12
15	1.08	0.16	0.15	0.05	0.03	0.06	0.03	1.23	0.13	2.93	3.54	6.49
20	1.13	0.16	0.16	0.05	0.03	0.06	0.03	1.32	0.14	3.10	3.78	6.91
25	1.19	0.17	0.17	0.05	0.04	0.06	0.03	1.42	0.15	3.29	4.07	7.38
30	1.25	0.17	0.18	0.05	0.04	0.06	0.03	1.53	0.17	3.50	4.40	7.92
35	1.32	0.17	0.19	0.06	0.05	0.06	0.03	1.67	0.18	3.73	4.78	8.54
40	1.40	0.18	0.20	0.06	0.05	0.06	0.03	1.83	0.20	4.01	5.24	9.28
45	1.48	0.18	0.20	0.06	0.06	0.06	0.03	2.02	0.22	4.32	5.80	10.15
50	1.57	0.18	0.21	0.07	0.06	0.06	0.03	2.26	0.25	4.70	6.50	11.23

Table VOC CARS 3
Economic Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.93	0.18	0.13	0.04	0.01	0.13	0.07	1.08	0.12	2.69	3.10	5.84
5	0.98	0.19	0.14	0.05	0.02	0.13	0.07	1.15	0.12	2.83	3.29	6.17
10	1.03	0.19	0.15	0.05	0.02	0.13	0.07	1.22	0.13	2.98	3.50	6.54
15	1.08	0.19	0.16	0.05	0.03	0.13	0.07	1.30	0.14	3.15	3.74	6.94
20	1.14	0.20	0.17	0.05	0.03	0.13	0.07	1.40	0.15	3.34	4.02	7.41
25	1.20	0.20	0.18	0.06	0.04	0.13	0.07	1.51	0.16	3.54	4.34	7.93
30	1.27	0.20	0.18	0.06	0.04	0.13	0.07	1.64	0.18	3.78	4.71	8.54
35	1.34	0.21	0.19	0.06	0.05	0.13	0.07	1.80	0.19	4.04	5.16	9.26
40	1.42	0.21	0.20	0.07	0.05	0.13	0.07	1.99	0.22	4.35	5.70	10.11
45	1.51	0.22	0.21	0.07	0.06	0.13	0.07	2.22	0.24	4.72	6.37	11.14
50	1.61	0.22	0.22	0.07	0.06	0.13	0.07	2.51	0.27	5.17	7.21	12.44

Table VOC CARS 4
Economic Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.93	0.22	0.14	0.05	0.01	0.19	0.10	1.13	0.12	2.89	3.25	6.23
5	0.98	0.23	0.15	0.05	0.02	0.19	0.10	1.21	0.13	3.05	3.46	6.59
10	1.03	0.23	0.15	0.05	0.02	0.19	0.10	1.29	0.14	3.21	3.70	6.99
15	1.08	0.24	0.16	0.06	0.03	0.19	0.10	1.38	0.15	3.40	3.97	7.44
20	1.15	0.24	0.17	0.06	0.03	0.19	0.10	1.49	0.16	3.60	4.28	7.96
25	1.21	0.25	0.18	0.06	0.04	0.19	0.10	1.62	0.18	3.83	4.64	8.56
30	1.28	0.26	0.19	0.07	0.04	0.19	0.10	1.77	0.19	4.10	5.08	9.25
35	1.36	0.26	0.20	0.07	0.05	0.19	0.10	1.95	0.21	4.40	5.60	10.08
40	1.45	0.27	0.21	0.07	0.05	0.19	0.10	2.18	0.24	4.76	6.24	11.09
45	1.55	0.28	0.22	0.08	0.06	0.19	0.10	2.46	0.27	5.20	7.05	12.33
50	1.66	0.28	0.23	0.08	0.06	0.19	0.10	2.83	0.31	5.74	8.10	13.93

Table VOC CARS 5
Economic Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.92	0.28	0.14	0.05	0.01	0.25	0.14	1.19	0.13	3.13	3.42	6.66
5	0.98	0.29	0.15	0.06	0.02	0.25	0.14	1.27	0.14	3.30	3.65	7.06
10	1.03	0.30	0.16	0.06	0.02	0.25	0.14	1.37	0.15	3.48	3.92	7.51
15	1.09	0.31	0.17	0.06	0.03	0.25	0.14	1.47	0.16	3.68	4.22	8.02
20	1.16	0.32	0.18	0.07	0.03	0.25	0.14	1.60	0.17	3.91	4.58	8.60
25	1.23	0.33	0.19	0.07	0.04	0.25	0.14	1.74	0.19	4.18	5.00	9.28
30	1.30	0.34	0.20	0.07	0.04	0.25	0.14	1.92	0.21	4.48	5.50	10.09
35	1.39	0.35	0.21	0.08	0.05	0.25	0.14	2.13	0.23	4.83	6.12	11.06
40	1.49	0.36	0.22	0.08	0.05	0.25	0.14	2.41	0.26	5.26	6.90	12.27
45	1.60	0.38	0.23	0.08	0.06	0.25	0.14	2.76	0.30	5.79	7.90	13.80
50	1.73	0.39	0.24	0.08	0.06	0.25	0.14	3.22	0.35	6.47	9.25	15.83

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Table VOC CARS 6
Economic Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.92	0.39	0.15	0.06	0.01	0.31	0.17	1.26	0.14	3.42	3.61	7.17
5	0.98	0.40	0.16	0.06	0.02	0.31	0.17	1.35	0.15	3.61	3.87	7.61
10	1.04	0.42	0.17	0.07	0.02	0.31	0.17	1.45	0.16	3.82	4.17	8.12
15	1.10	0.44	0.18	0.07	0.03	0.31	0.17	1.57	0.17	4.05	4.51	8.70
20	1.17	0.46	0.19	0.07	0.03	0.31	0.17	1.72	0.19	4.32	4.92	9.37
25	1.25	0.48	0.20	0.08	0.04	0.31	0.17	1.89	0.20	4.62	5.41	10.17
30	1.33	0.51	0.21	0.08	0.04	0.31	0.17	2.09	0.23	4.98	6.01	11.12
35	1.43	0.53	0.22	0.08	0.05	0.31	0.17	2.35	0.25	5.41	6.76	12.30
40	1.53	0.56	0.23	0.08	0.05	0.31	0.17	2.69	0.29	5.93	7.71	13.78
45	1.66	0.60	0.24	0.09	0.06	0.31	0.17	3.13	0.34	6.61	8.99	15.73
50	1.82	0.64	0.25	0.09	0.06	0.31	0.17	3.75	0.41	7.51	10.77	18.42

Table VOC CARS 7
Economic Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.93	0.62	0.16	0.07	0.01	0.38	0.21	1.33	0.14	3.85	3.82	7.84
5	0.98	0.66	0.17	0.07	0.02	0.38	0.21	1.43	0.16	4.08	4.11	8.36
10	1.05	0.71	0.18	0.07	0.02	0.38	0.21	1.55	0.17	4.34	4.45	8.95
15	1.12	0.77	0.19	0.08	0.03	0.38	0.21	1.69	0.18	4.63	4.85	9.64
20	1.19	0.83	0.20	0.08	0.03	0.38	0.21	1.85	0.20	4.97	5.32	10.46
25	1.27	0.91	0.21	0.08	0.04	0.38	0.21	2.06	0.22	5.37	5.90	11.43
30	1.37	1.00	0.22	0.08	0.04	0.38	0.21	2.31	0.25	5.85	6.62	12.63
35	1.47	1.11	0.23	0.09	0.05	0.38	0.21	2.63	0.28	6.44	7.53	14.14
40	1.60	1.25	0.24	0.09	0.05	0.38	0.21	3.05	0.33	7.19	8.74	16.10
45	1.75	1.43	0.24	0.09	0.06	0.38	0.21	3.63	0.39	8.19	10.42	18.77
50	1.95	1.68	0.25	0.10	0.06	0.38	0.21	4.49	0.49	9.60	12.89	22.66

Table VOC CARS 8
Economic Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.93	0.84	0.17	0.07	0.01	0.44	0.24	1.42	0.15	4.27	4.06	8.52
5	0.99	0.91	0.18	0.07	0.02	0.44	0.24	1.53	0.17	4.55	4.39	9.13
10	1.06	1.01	0.19	0.08	0.02	0.44	0.24	1.66	0.18	4.88	4.77	9.85
15	1.13	1.12	0.20	0.08	0.03	0.44	0.24	1.82	0.20	5.26	5.23	10.69
20	1.22	1.26	0.21	0.08	0.03	0.44	0.24	2.02	0.22	5.72	5.79	11.70
25	1.31	1.45	0.21	0.09	0.04	0.44	0.24	2.26	0.24	6.28	6.48	12.95
30	1.41	1.52	0.22	0.09	0.04	0.44	0.24	2.57	0.28	6.81	7.36	14.36
35	1.53	1.63	0.23	0.09	0.05	0.44	0.24	2.97	0.32	7.50	8.51	16.21
40	1.68	1.63	0.24	0.10	0.05	0.44	0.24	3.52	0.38	8.28	10.09	18.56
45	1.87	1.63	0.25	0.10	0.06	0.44	0.24	4.32	0.47	9.38	12.39	21.96
50	2.14	1.63	0.26	0.10	0.06	0.44	0.24	5.60	0.61	11.08	16.05	27.32

Table VOC CARS 9
Economic Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.94	1.63	0.18	0.08	0.01	0.50	0.28	1.51	0.16	5.29	4.33	9.83
5	1.01	1.63	0.19	0.08	0.02	0.50	0.28	1.64	0.18	5.52	4.70	10.44
10	1.08	1.63	0.19	0.08	0.02	0.50	0.28	1.80	0.19	5.78	5.15	11.15
15	1.16	1.63	0.20	0.09	0.03	0.50	0.28	1.98	0.21	6.08	5.69	11.99
20	1.25	1.63	0.21	0.09	0.03	0.50	0.28	2.21	0.24	6.45	6.35	13.02
25	1.35	1.63	0.22	0.09	0.04	0.50	0.28	2.51	0.27	6.89	7.19	14.30
30	1.46	1.63	0.23	0.10	0.04	0.50	0.28	2.89	0.31	7.45	8.29	15.96
35	1.61	1.63	0.24	0.10	0.05	0.50	0.28	3.41	0.37	8.18	9.78	18.19
40	1.79	1.63	0.25	0.10	0.05	0.50	0.28	4.16	0.45	9.21	11.93	21.36
45	2.04	1.63	0.26	0.10	0.06	0.50	0.28	5.33	0.58	10.78	15.29	26.28
50	2.44	1.63	0.27	0.11	0.06	0.50	0.28	7.42	0.80	13.51	21.27	35.00

Table VOC CARS 10
Economic Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 11000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.95	1.63	0.18	0.08	0.01	0.57	0.31	1.62	0.17	5.53	4.64	10.41
5	1.02	1.63	0.19	0.09	0.02	0.57	0.31	1.77	0.19	5.78	5.07	11.10
10	1.10	1.63	0.20	0.09	0.02	0.57	0.31	1.95	0.21	6.08	5.59	11.92
15	1.19	1.63	0.21	0.09	0.03	0.57	0.31	2.17	0.24	6.43	6.23	12.91
20	1.29	1.63	0.22	0.10	0.03	0.57	0.31	2.45	0.27	6.86	7.04	14.14
25	1.40	1.63	0.23	0.10	0.04	0.57	0.31	2.82	0.30	7.40	8.08	15.72
30	1.54	1.63	0.24	0.10	0.04	0.57	0.31	3.31	0.36	8.10	9.49	17.84
35	1.71	1.63	0.25	0.10	0.05	0.57	0.31	4.01	0.43	9.06	11.50	20.81
40	1.95	1.63	0.26	0.11	0.05	0.57	0.31	5.09	0.55	10.51	14.59	25.35
45	2.31	1.63	0.27	0.11	0.06	0.57	0.31	6.95	0.75	12.96	19.95	33.16
50	3.04	1.63	0.28	0.11	0.06	0.57	0.31	10.98	1.19	18.17	31.51	49.93

Table VOC CARS 11
Economic Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 12000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.97	1.63	0.19	0.09	0.01	0.63	0.35	1.74	0.19	5.79	4.99	11.05
5	1.04	1.63	0.20	0.09	0.02	0.63	0.35	1.92	0.21	6.08	5.49	11.85
10	1.13	1.63	0.21	0.10	0.02	0.63	0.35	2.13	0.23	6.42	6.11	12.81
15	1.22	1.63	0.22	0.10	0.03	0.63	0.35	2.40	0.26	6.83	6.89	13.99
20	1.34	1.63	0.23	0.10	0.03	0.63	0.35	2.75	0.30	7.35	7.88	15.51
25	1.47	1.63	0.24	0.10	0.04	0.63	0.35	3.21	0.35	8.02	9.22	17.51
30	1.63	1.63	0.25	0.11	0.04	0.63	0.35	3.87	0.42	8.93	11.11	20.30
35	1.86	1.63	0.26	0.11	0.05	0.63	0.35	4.87	0.53	10.27	13.96	24.50
40	2.19	1.63	0.27	0.11	0.05	0.63	0.35	6.55	0.71	12.48	18.78	31.54
45	2.82	1.63	0.28	0.12	0.06	0.63	0.35	10.00	1.08	16.96	28.69	45.92
50	3.56	1.63	0.29	0.12	0.06	0.63	0.35	14.07	1.52	22.22	40.35	62.85

Table VOC CARS 12
Economic Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 13000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.99	1.63	0.20	0.10	0.01	0.69	0.38	1.88	0.20	6.08	5.40	11.78
5	1.07	1.63	0.21	0.10	0.02	0.69	0.38	2.09	0.23	6.41	6.00	12.71
10	1.16	1.63	0.22	0.10	0.02	0.69	0.38	2.35	0.25	6.81	6.74	13.85
15	1.27	1.63	0.23	0.10	0.03	0.69	0.38	2.68	0.29	7.31	7.69	15.30
20	1.40	1.63	0.24	0.11	0.03	0.69	0.38	3.12	0.34	7.94	8.96	17.21
25	1.56	1.63	0.25	0.11	0.04	0.69	0.38	3.74	0.41	8.80	10.73	19.83
30	1.77	1.63	0.26	0.11	0.04	0.69	0.38	4.66	0.50	10.05	13.37	23.72
35	2.08	1.63	0.27	0.12	0.05	0.69	0.38	6.18	0.67	12.06	17.74	30.10
40	2.63	1.63	0.27	0.12	0.05	0.69	0.38	9.18	0.99	15.95	26.33	42.59
45	3.35	1.63	0.28	0.12	0.06	0.69	0.38	13.13	1.42	21.07	37.66	59.03
50	3.68	1.63	0.29	0.13	0.06	0.69	0.38	14.77	1.60	23.24	42.37	65.91

Table VOC CARS 13
Economic Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 14000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.01	1.63	0.21	0.10	0.01	0.75	0.41	2.05	0.22	6.41	5.89	12.62
5	1.10	1.63	0.22	0.10	0.02	0.75	0.41	2.30	0.25	6.79	6.60	13.72
10	1.21	1.63	0.23	0.11	0.02	0.75	0.41	2.62	0.28	7.27	7.51	15.11
15	1.33	1.63	0.24	0.11	0.03	0.75	0.41	3.04	0.33	7.87	8.72	16.92
20	1.49	1.63	0.25	0.11	0.03	0.75	0.41	3.62	0.39	8.69	10.39	19.40
25	1.68	1.63	0.25	0.12	0.04	0.75	0.41	4.48	0.48	9.85	12.84	23.02
30	1.97	1.63	0.26	0.12	0.04	0.75	0.41	5.86	0.63	11.69	16.81	28.83
35	2.47	1.63	0.27	0.12	0.05	0.75	0.41	8.48	0.92	15.11	24.33	39.77
40	3.66	1.63	0.28	0.13	0.05	0.75	0.41	15.35	1.66	23.93	44.05	68.31
45	3.90	1.63	0.29	0.13	0.06	0.75	0.41	16.41	1.78	25.37	47.08	72.77
50	4.13	1.63	0.30	0.13	0.06	0.75	0.41	17.38	1.88	26.68	49.85	76.85

Table VOC CARS 14
Economic Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 15000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.04	1.63	0.22	0.11	0.01	0.82	0.45	2.25	0.24	6.77	6.47	13.60
5	1.15	1.63	0.22	0.11	0.02	0.82	0.45	2.56	0.28	7.23	7.34	14.93
10	1.27	1.63	0.23	0.11	0.02	0.82	0.45	2.96	0.32	7.81	8.49	16.66
15	1.41	1.63	0.24	0.12	0.03	0.82	0.45	3.51	0.38	8.58	10.06	19.00
20	1.60	1.63	0.25	0.12	0.03	0.82	0.45	4.30	0.47	9.67	12.34	22.37
25	1.87	1.63	0.26	0.12	0.04	0.82	0.45	5.57	0.60	11.36	15.97	27.68
30	2.31	1.63	0.27	0.13	0.04	0.82	0.45	7.88	0.85	14.39	22.61	37.35
35	3.30	1.63	0.28	0.13	0.05	0.82	0.45	13.50	1.46	21.61	38.72	60.69
40	3.84	1.63	0.29	0.13	0.05	0.82*	0.45	16.41	1.78	25.40	47.08	72.84
45	4.07	1.63	0.30	0.13	0.06	0.82	0.45	17.38	1.88	26.72	49.85	76.92
50	4.32	1.63	0.31	0.14	0.06	0.82	0.45	18.46	2.00	28.18	52.96	81.50

Table VOC CARS 15
Economic Cost of Operation of Cars on Intermediate Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.00	0.12	0.11	0.03	0.01	0.02	0.01	0.90	0.10	2.30	2.57	4.88
5	1.04	0.13	0.12	0.03	0.02	0.02	0.01	0.94	0.10	2.40	2.71	5.12
10	1.08	0.13	0.13	0.03	0.02	0.02	0.01	1.00	0.11	2.52	2.86	5.38
15	1.12	0.13	0.14	0.04	0.03	0.02	0.01	1.05	0.11	2.64	3.02	5.68
20	1.16	0.13	0.14	0.04	0.03	0.02	0.01	1.12	0.12	2.78	3.21	6.00
25	1.21	0.13	0.15	0.04	0.04	0.02	0.01	1.19	0.13	2.93	3.43	6.36
30	1.26	0.13	0.16	0.05	0.04	0.02	0.01	1.28	0.14	3.10	3.67	6.77
35	1.32	0.14	0.17	0.05	0.05	0.02	0.01	1.38	0.15	3.28	3.95	7.24
40	1.38	0.14	0.18	0.05	0.05	0.02	0.01	1.49	0.16	3.49	4.28	7.77
45	1.44	0.14	0.19	0.05	0.06	0.02	0.01	1.63	0.18	3.72	4.67	8.40
50	1.52	0.14	0.20	0.06	0.06	0.02	0.01	1.79	0.19	3.99	5.13	9.13

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Table VOC CARS 16
Economic Cost of Operation of Cars on Intermediate Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.00	0.14	0.11	0.03	0.01	0.06	0.03	0.92	0.10	2.41	2.65	5.09
5	1.03	0.14	0.12	0.03	0.02	0.06	0.03	0.97	0.11	2.52	2.80	5.35
10	1.07	0.14	0.13	0.04	0.02	0.06	0.03	1.03	0.11	2.64	2.96	5.63
15	1.12	0.14	0.14	0.04	0.03	0.06	0.03	1.09	0.12	2.78	3.14	5.94
20	1.16	0.14	0.15	0.04	0.03	0.06	0.03	1.16	0.13	2.92	3.34	6.29
25	1.21	0.15	0.16	0.05	0.04	0.06	0.03	1.24	0.13	3.08	3.57	6.68
30	1.27	0.15	0.17	0.05	0.04	0.06	0.03	1.34	0.14	3.26	3.84	7.12
35	1.32	0.15	0.18	0.05	0.05	0.06	0.03	1.45	0.16	3.45	4.15	7.63
40	1.39	0.15	0.19	0.06	0.05	0.06	0.03	1.57	0.17	3.68	4.51	8.21
45	1.46	0.15	0.20	0.06	0.06	0.06	0.03	1.72	0.19	3.93	4.94	8.90
50	1.54	0.16	0.21	0.06	0.06	0.06	0.03	1.90	0.21	4.23	5.46	9.72

Table VOC CARS 17
Economic Cost of Operation of Cars on Intermediate Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.99	0.15	0.12	0.04	0.01	0.13	0.07	0.95	0.10	2.56	2.74	5.35
5	1.03	0.15	0.13	0.04	0.02	0.13	0.07	1.01	0.11	2.68	2.89	5.62
10	1.07	0.15	0.14	0.04	0.02	0.13	0.07	1.07	0.12	2.80	3.06	5.92
15	1.11	0.16	0.15	0.04	0.03	0.13	0.07	1.14	0.12	2.94	3.26	6.26
20	1.16	0.16	0.16	0.05	0.03	0.13	0.07	1.21	0.13	3.10	3.48	6.63
25	1.22	0.16	0.17	0.05	0.04	0.13	0.07	1.30	0.14	3.27	3.73	7.05
30	1.27	0.16	0.17	0.05	0.04	0.13	0.07	1.40	0.15	3.46	4.02	7.53
35	1.33	0.17	0.18	0.06	0.05	0.13	0.07	1.52	0.16	3.67	4.36	8.08
40	1.40	0.17	0.19	0.06	0.05	0.13	0.07	1.66	0.18	3.91	4.76	8.73
45	1.48	0.17	0.20	0.06	0.06	0.13	0.07	1.83	0.20	4.19	5.25	9.50
50	1.56	0.17	0.21	0.07	0.06	0.13	0.07	2.04	0.22	4.53	5.84	10.42

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Table VOC CARS 18
Economic Cost of Operation of Cars on Intermediate Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.98	0.16	0.12	0.04	0.01	0.19	0.10	0.99	0.11	2.71	2.83	5.62
5	1.02	0.17	0.13	0.04	0.02	0.19	0.10	1.04	0.11	2.84	2.99	5.91
10	1.07	0.17	0.14	0.05	0.02	0.19	0.10	1.11	0.12	2.97	3.18	6.23
15	1.12	0.17	0.15	0.05	0.03	0.19	0.10	1.18	0.13	3.12	3.39	6.59
20	1.17	0.18	0.16	0.05	0.03	0.19	0.10	1.26	0.14	3.28	3.63	6.99
25	1.22	0.18	0.17	0.05	0.04	0.19	0.10	1.36	0.15	3.46	3.90	7.45
30	1.28	0.18	0.18	0.06	0.04	0.19	0.10	1.47	0.16	3.67	4.22	7.97
35	1.35	0.19	0.19	0.06	0.05	0.19	0.10	1.60	0.17	3.90	4.60	8.58
40	1.42	0.19	0.20	0.06	0.05	0.19	0.10	1.76	0.19	4.17	5.05	9.30
45	1.50	0.19	0.21	0.07	0.06	0.19	0.10	1.95	0.21	4.48	5.59	10.15
50	1.59	0.20	0.22	0.07	0.06	0.19	0.10	2.19	0.24	4.85	6.28	11.21

Table VOC CARS 19
Economic Cost of Operation of Cars on Intermediate Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.98	0.18	0.13	0.04	0.01	0.25	0.14	1.02	0.11	2.87	2.93	5.91
5	1.02	0.19	0.14	0.05	0.02	0.25	0.14	1.08	0.12	3.00	3.11	6.22
10	1.07	0.19	0.15	0.05	0.02	0.25	0.14	1.15	0.12	3.15	3.30	6.56
15	1.12	0.20	0.16	0.05	0.03	0.25	0.14	1.23	0.13	3.31	3.53	6.95
20	1.17	0.20	0.17	0.06	0.03	0.25	0.14	1.32	0.14	3.48	3.79	7.38
25	1.23	0.20	0.18	0.06	0.04	0.25	0.14	1.43	0.15	3.68	4.09	7.88
30	1.29	0.21	0.19	0.06	0.04	0.25	0.14	1.55	0.17	3.90	4.44	8.45
35	1.36	0.21	0.19	0.06	0.05	0.25	0.14	1.70	0.18	4.15	4.86	9.12
40	1.44	0.22	0.20	0.07	0.05	0.25	0.14	1.87	0.20	4.44	5.37	9.92
45	1.52	0.22	0.21	0.07	0.06	0.25	0.14	2.09	0.23	4.79	5.99	10.89
50	1.62	0.23	0.22	0.07	0.06	0.25	0.14	2.36	0.26	5.21	6.78	12.10

Table VOC CARS 20
Economic Cost of Operation of Cars on Intermediate Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.98	0.21	0.13	0.05	0.01	0.31	0.17	1.06	0.11	3.04	3.03	6.21
5	1.02	0.22	0.14	0.05	0.02	0.31	0.17	1.12	0.12	3.18	3.22	6.54
10	1.07	0.22	0.15	0.05	0.02	0.31	0.17	1.20	0.13	3.34	3.44	6.91
15	1.12	0.23	0.16	0.06	0.03	0.31	0.17	1.28	0.14	3.50	3.68	7.33
#	1.18	0.23	0.17	0.06	0.03	0.31	0.17	1.38	0.15	3.69	3.97	7.80
25	1.24	0.24	0.18	0.06	0.04	0.31	0.17	1.50	0.16	3.90	4.30	8.34
#	1.30	0.24	0.19	0.07	0.04	0.31	0.17	1.64	0.18	4.15	4.69	8.97
35	1.38	0.25	0.20	0.07	0.05	0.31	0.17	1.80	0.19	4.42	5.16	9.72
#	1.46	0.25	0.21	0.07	0.05	0.31	0.17	2.00	0.22	4.75	5.73	10.62
45	1.55	0.26	0.22	0.07	0.06	0.31	0.17	2.25	0.24	5.14	6.45	11.73
50	1.65	0.27	0.23	0.08	0.06	0.31	0.17	2.57	0.28	5.63	7.37	13.14

Table VOC CARS 21
Economic Cost of Operation of Cars on Intermediate Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.97	0.25	0.14	0.05	0.01	0.38	0.21	1.10	0.12	3.22	3.15	6.54
5	1.02	0.25	0.15	0.05	0.02	0.38	0.21	1.17	0.13	3.37	3.35	6.89
10	1.07	0.26	0.16	0.06	0.02	0.38	0.21	1.25	0.14	3.54	3.59	7.29
15	1.13	0.26	0.17	0.06	0.03	0.38	0.21	1.34	0.15	3.72	3.85	7.74
20	1.19	0.27	0.18	0.06	0.03	0.38	0.21	1.45	0.16	3.92	4.16	8.25
25	1.25	0.28	0.19	0.07	0.04	0.38	0.21	1.58	0.17	4.16	4.53	8.85
30	1.32	0.29	0.20	0.07	0.04	0.38	0.21	1.73	0.19	4.42	4.97	9.55
35	1.40	0.30	0.21	0.07	0.05	0.38	0.21	1.92	0.21	4.73	5.50	10.39
40	1.48	0.31	0.21	0.08	0.05	0.38	0.21	2.14	0.23	5.09	6.15	11.41
45	1.58	0.32	0.22	0.08	0.06	0.38	0.21	2.44	0.26	5.54	6.99	12.69
50	1.70	0.33	0.23	0.08	0.06	0.38	0.21	2.82	0.30	6.11	8.08	14.35

Table VOC CARS 22
Economic Cost of Operation of Cars on Intermediate Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.97	0.29	0.15	0.06	0.01	0.44	0.24	1.14	0.12	3.43	3.27	6.89
5	1.02	0.30	0.15	0.06	0.02	0.44	0.24	1.22	0.13	3.59	3.49	7.27
10	1.08	0.31	0.16	0.06	0.02	0.44	0.24	1.31	0.14	3.76	3.74	7.70
15	1.13	0.32	0.17	0.06	0.03	0.44	0.24	1.41	0.15	3.96	4.04	8.19
20	1.20	0.33	0.18	0.07	0.03	0.44	0.24	1.53	0.17	4.19	4.38	8.76
25	1.26	0.34	0.19	0.07	0.04	0.44	0.24	1.67	0.18	4.44	4.79	9.42
30	1.34	0.36	0.20	0.07	0.04	0.44	0.24	1.84	0.20	4.73	5.28	10.20
35	1.42	0.37	0.21	0.08	0.05	0.44	0.24	2.05	0.22	5.08	5.88	11.15
40	1.51	0.38	0.22	0.08	0.05	0.44	0.24	2.31	0.25	5.50	6.64	12.32
45	1.62	0.40	0.23	0.08	0.06	0.44	0.24	2.66	0.29	6.02	7.62	13.82
50	1.75	0.42	0.24	0.09	0.06	0.44	0.24	3.12	0.34	6.69	8.94	15.82

Table VOC CARS 23
Economic Cost of Operation of Cars on Intermediate Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.98	0.36	0.15	0.06	0.01	0.50	0.28	1.19	0.13	3.65	3.40	7.27
5	1.03	0.38	0.16	0.06	0.02	0.50	0.28	1.27	0.14	3.83	3.64	7.69
10	1.08	0.39	0.17	0.07	0.02	0.50	0.28	1.37	0.15	4.02	3.92	8.16
15	1.14	0.41	0.18	0.07	0.03	0.50	0.28	1.48	0.16	4.24	4.24	8.70
20	1.21	0.43	0.19	0.07	0.03	0.50	0.28	1.61	0.17	4.49	4.62	9.33
25	1.28	0.44	0.20	0.07	0.04	0.50	0.28	1.77	0.19	4.77	5.08	10.07
30	1.36	0.47	0.21	0.08	0.04	0.50	0.28	1.96	0.21	5.11	5.63	10.95
35	1.45	0.49	0.22	0.08	0.05	0.50	0.28	2.20	0.24	5.50	6.32	12.04
40	1.55	0.51	0.23	0.08	0.05	0.50	0.28	2.51	0.27	5.99	7.20	13.41
45	1.67	0.54	0.24	0.09	0.06	0.50	0.28	2.92	0.32	6.61	8.37	15.20
50	1.82	0.57	0.24	0.09	0.06	0.50	0.28	3.48	0.38	7.43	10.00	17.65

Table VOC CARS 24
Economic Cost of Operation of Cars on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.08	0.12	0.11	0.03	0.01	0.01	0.01	0.81	0.09	2.26	3.11	5.39
5	1.11	0.12	0.11	0.03	0.02	0.01	0.01	0.85	0.09	2.35	3.27	5.64
10	1.14	0.12	0.12	0.03	0.02	0.01	0.01	0.89	0.10	2.45	3.45	5.91
15	1.17	0.12	0.13	0.03	0.03	0.01	0.01	0.95	0.10	2.56	3.65	6.22
20	1.21	0.13	0.14	0.04	0.03	0.01	0.01	1.00	0.11	2.68	3.87	6.55
25	1.25	0.13	0.15	0.04	0.04	0.01	0.01	1.07	0.12	2.81	4.11	6.93
30	1.29	0.13	0.16	0.04	0.04	0.01	0.01	1.14	0.12	2.95	4.40	7.36
35	1.34	0.13	0.17	0.05	0.05	0.01	0.01	1.22	0.13	3.11	4.72	7.84
40	1.39	0.13	0.18	0.05	0.05	0.01	0.01	1.32	0.14	3.29	5.10	8.40
45	1.45	0.13	0.19	0.05	0.06	0.01	0.01	1.44	0.16	3.49	5.54	9.04
50	1.51	0.14	0.20	0.06	0.06	0.01	0.01	1.57	0.17	3.73	6.06	9.80

Table VOC CARS 25
Economic Cost of Operation of Cars on Two Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.08	0.13	0.11	0.03	0.01	0.06	0.03	0.83	0.09	2.37	3.19	5.59
5	1.10	0.13	0.12	0.03	0.02	0.06	0.03	0.87	0.09	2.46	3.36	5.85
10	1.13	0.13	0.13	0.03	0.02	0.06	0.03	0.92	0.10	2.57	3.54	6.14
15	1.17	0.13	0.14	0.04	0.03	0.06	0.03	0.97	0.11	2.68	3.75	6.46
20	1.21	0.13	0.15	0.04	0.03	0.06	0.03	1.03	0.11	2.80	3.98	6.81
25	1.25	0.14	0.16	0.04	0.04	0.06	0.03	1.10	0.12	2.94	4.25	7.21
30	1.29	0.14	0.17	0.05	0.04	0.06	0.03	1.18	0.13	3.09	4.55	7.67
35	1.34	0.14	0.18	0.05	0.05	0.06	0.03	1.27	0.14	3.26	4.89	8.18
40	1.40	0.14	0.18	0.05	0.05	0.06	0.03	1.37	0.15	3.45	5.30	8.78
45	1.46	0.14	0.19	0.06	0.06	0.06	0.03	1.50	0.16	3.67	5.78	9.47
50	1.52	0.15	0.20	0.06	0.06	0.06	0.03	1.65	0.18	3.92	6.35	10.30

Table VOC CARS 26
Economic Cost of Operation of Cars on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.07	0.14	0.11	0.03	0.01	0.13	0.07	0.85	0.09	2.50	3.27	5.82
5	1.10	0.14	0.12	0.03	0.02	0.13	0.07	0.89	0.10	2.60	3.44	6.10
10	1.13	0.14	0.13	0.04	0.02	0.13	0.07	0.94	0.10	2.71	3.64	6.40
15	1.17	0.14	0.14	0.04	0.03	0.13	0.07	1.00	0.11	2.82	3.86	6.74
20	1.21	0.14	0.15	0.04	0.03	0.13	0.07	1.06	0.12	2.95	4.10	7.11
25	1.25	0.15	0.16	0.05	0.04	0.13	0.07	1.14	0.12	3.10	4.39	7.54
30	1.30	0.15	0.17	0.05	0.04	0.13	0.07	1.22	0.13	3.26	4.71	8.02
35	1.35	0.15	0.18	0.05	0.05	0.13	0.07	1.32	0.14	3.44	5.08	8.57
40	1.41	0.15	0.19	0.06	0.05	0.13	0.07	1.43	0.15	3.64	5.52	9.21
45	1.47	0.16	0.20	0.06	0.06	0.13	0.07	1.57	0.17	3.87	6.04	9.97
50	1.54	0.16	0.21	0.06	0.06	0.13	0.07	1.73	0.19	4.14	6.67	10.86

Table VOC CARS 27
Economic Cost of Operation of Cars on Two Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.06	0.15	0.12	0.03	0.01	0.19	0.10	0.87	0.09	2.63	3.35	6.06
5	1.09	0.15	0.13	0.04	0.02	0.19	0.10	0.92	0.10	2.74	3.53	6.35
10	1.13	0.15	0.14	0.04	0.02	0.19	0.10	0.97	0.11	2.85	3.74	6.67
15	1.16	0.15	0.15	0.04	0.03	0.19	0.10	1.03	0.11	2.97	3.97	7.03
20	1.21	0.16	0.16	0.05	0.03	0.19	0.10	1.10	0.12	3.11	4.24	7.43
25	1.25	0.16	0.16	0.05	0.04	0.19	0.10	1.18	0.13	3.26	4.54	7.88
30	1.30	0.16	0.17	0.05	0.04	0.19	0.10	1.27	0.14	3.43	4.88	8.39
35	1.36	0.16	0.18	0.06	0.05	0.19	0.10	1.37	0.15	3.62	5.28	8.98
40	1.42	0.17	0.19	0.06	0.05	0.19	0.10	1.49	0.16	3.84	5.76	9.68
45	1.48	0.17	0.20	0.06	0.06	0.19	0.10	1.64	0.18	4.09	6.33	10.49
50	1.56	0.17	0.21	0.07	0.06	0.19	0.10	1.82	0.20	4.38	7.02	11.48

Table VOC CARS 28
Economic Cost of Operation of Cars on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.06	0.16	0.12	0.04	0.01	0.25	0.14	0.89	0.10	2.77	3.44	6.31
5	1.09	0.16	0.13	0.04	0.02	0.25	0.14	0.94	0.10	2.88	3.63	6.62
10	1.13	0.17	0.14	0.04	0.02	0.25	0.14	1.00	0.11	2.99	3.85	6.95
15	1.16	0.17	0.15	0.05	0.03	0.25	0.14	1.06	0.11	3.13	4.09	7.33
20	1.21	0.17	0.16	0.05	0.03	0.25	0.14	1.13	0.12	3.27	4.37	7.75
25	1.25	0.17	0.17	0.05	0.04	0.25	0.14	1.22	0.13	3.43	4.69	8.23
30	1.31	0.18	0.18	0.06	0.04	0.25	0.14	1.31	0.14	3.61	5.07	8.78
35	1.36	0.18	0.19	0.06	0.05	0.25	0.14	1.43	0.15	3.81	5.50	9.42
40	1.43	0.18	0.20	0.06	0.05	0.25	0.14	1.56	0.17	4.04	6.02	10.17
45	1.50	0.19	0.21	0.07	0.06	0.25	0.14	1.72	0.19	4.31	6.64	11.06
50	1.57	0.19	0.22	0.07	0.06	0.25	0.14	1.92	0.21	4.63	7.41	12.15

Table VOC CARS 29
Economic Cost of Operation of Cars on Two Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.05	0.17	0.13	0.04	0.01	0.31	0.17	0.91	0.10	2.91	3.53	6.57
5	1.09	0.18	0.14	0.04	0.02	0.31	0.17	0.97	0.10	3.02	3.73	6.89
10	1.12	0.18	0.15	0.05	0.02	0.31	0.17	1.03	0.11	3.15	3.96	7.25
15	1.16	0.18	0.15	0.05	0.03	0.31	0.17	1.10	0.12	3.28	4.22	7.65
20	1.21	0.19	0.16	0.05	0.03	0.31	0.17	1.17	0.13	3.44	4.52	8.09
25	1.26	0.19	0.17	0.06	0.04	0.31	0.17	1.26	0.14	3.60	4.87	8.61
30	1.31	0.19	0.18	0.06	0.04	0.31	0.17	1.37	0.15	3.79	5.27	9.20
35	1.37	0.20	0.19	0.06	0.05	0.31	0.17	1.49	0.16	4.01	5.74	9.89
40	1.44	0.20	0.20	0.07	0.05	0.31	0.17	1.63	0.18	4.26	6.30	10.70
45	1.51	0.21	0.21	0.07	0.06	0.31	0.17	1.81	0.20	4.55	6.99	11.68
50	1.60	0.21	0.22	0.07	0.06	0.31	0.17	2.03	0.22	4.90	7.85	12.89

Table VOC CARS 30
Economic Cost of Operation of Cars on Two Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.05	0.19	0.13	0.04	0.01	0.38	0.21	0.94	0.10	3.05	3.62	6.84
5	1.08	0.20	0.14	0.05	0.02	0.38	0.21	1.00	0.11	3.17	3.84	7.18
10	1.12	0.20	0.15	0.05	0.02	0.38	0.21	1.06	0.11	3.30	4.08	7.55
15	1.17	0.20	0.16	0.05	0.03	0.38	0.21	1.13	0.12	3.45	4.36	7.98
20	1.21	0.21	0.17	0.06	0.03	0.38	0.21	1.21	0.13	3.61	4.68	8.46
25	1.26	0.21	0.18	0.06	0.04	0.38	0.21	1.31	0.14	3.79	5.05	9.00
30	1.32	0.22	0.19	0.06	0.04	0.38	0.21	1.42	0.15	3.99	5.48	9.64
35	1.38	0.22	0.20	0.07	0.05	0.38	0.21	1.56	0.17	4.22	6.00	10.38
40	1.45	0.23	0.21	0.07	0.05	0.38	0.21	1.72	0.19	4.49	6.61	11.27
45	1.53	0.23	0.22	0.07	0.06	0.38	0.21	1.91	0.21	4.81	7.38	12.35
50	1.62	0.24	0.22	0.07	0.06	0.38	0.21	2.16	0.23	5.20	8.34	13.70

Table VOC CARS 31
Economic Cost of Operation of Cars on Two Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.05	0.21	0.13	0.05	0.01	0.44	0.24	0.97	0.10	3.21	3.72	7.12
5	1.08	0.22	0.14	0.05	0.02	0.44	0.24	1.03	0.11	3.33	3.95	7.48
10	1.12	0.22	0.15	0.05	0.02	0.44	0.24	1.09	0.12	3.47	4.21	7.88
15	1.17	0.23	0.16	0.06	0.03	0.44	0.24	1.17	0.13	3.62	4.51	8.32
20	1.22	0.23	0.17	0.06	0.03	0.44	0.24	1.26	0.14	3.79	4.85	8.84
25	1.27	0.24	0.18	0.06	0.04	0.44	0.24	1.36	0.15	3.98	5.25	9.43
30	1.33	0.24	0.19	0.07	0.04	0.44	0.24	1.48	0.16	4.20	5.72	10.11
35	1.40	0.25	0.20	0.07	0.05	0.44	0.24	1.63	0.18	4.45	6.28	10.92
40	1.47	0.26	0.21	0.07	0.05	0.44	0.24	1.81	0.20	4.75	6.96	11.90
45	1.55	0.26	0.22	0.07	0.06	0.44	0.24	2.03	0.22	5.10	7.81	13.10
50	1.65	0.27	0.23	0.08	0.06	0.44	0.24	2.31	0.25	5.53	8.89	14.61

Table VOC CARS 32
Economic Cost of Operation of Cars on Two Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.04	0.24	0.14	0.05	0.01	0.50	0.28	0.99	0.11	3.37	3.83	7.42
5	1.08	0.25	0.15	0.05	0.02	0.50	0.28	1.06	0.11	3.50	4.08	7.79
10	1.12	0.25	0.16	0.06	0.02	0.50	0.28	1.13	0.12	3.64	4.35	8.22
15	1.17	0.26	0.17	0.06	0.03	0.50	0.28	1.21	0.13	3.81	4.67	8.69
20	1.22	0.27	0.18	0.06	0.03	0.50	0.28	1.31	0.14	3.99	5.04	9.24
25	1.28	0.27	0.19	0.07	0.04	0.50	0.28	1.42	0.15	4.19	5.47	9.88
30	1.34	0.28	0.20	0.07	0.04	0.50	0.28	1.55	0.17	4.43	5.97	10.62
35	1.41	0.29	0.20	0.07	0.05	0.50	0.28	1.71	0.18	4.70	6.59	11.51
40	1.49	0.30	0.21	0.07	0.05	0.50	0.28	1.90	0.21	5.02	7.34	12.58
45	1.58	0.31	0.22	0.08	0.06	0.50	0.28	2.15	0.23	5.41	8.29	13.92
50	1.68	0.32	0.23	0.08	0.06	0.50	0.28	2.47	0.27	5.89	9.53	15.64

Table VOC CARS 33
Economic Cost of Operation of Cars on Four Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.15	0.11	0.10	0.02	0.01	0.01	0.01	0.75	0.08	2.25	2.90	5.16
5	1.17	0.11	0.11	0.03	0.02	0.01	0.01	0.79	0.09	2.33	3.05	5.39
10	1.19	0.12	0.12	0.03	0.02	0.01	0.01	0.83	0.09	2.42	3.21	5.64
15	1.22	0.12	0.13	0.03	0.03	0.01	0.01	0.88	0.10	2.52	3.39	5.92
20	1.25	0.12	0.14	0.03	0.03	0.01	0.01	0.93	0.10	2.63	3.60	6.23
25	1.28	0.12	0.15	0.04	0.04	0.01	0.01	0.99	0.11	2.74	3.83	6.58
30	1.32	0.12	0.16	0.04	0.04	0.01	0.01	1.06	0.11	2.88	4.09	6.97
35	1.36	0.12	0.17	0.04	0.05	0.01	0.01	1.14	0.12	3.02	4.39	7.42
40	1.40	0.12	0.18	0.05	0.05	0.01	0.01	1.23	0.13	3.19	4.74	7.94
45	1.46	0.13	0.19	0.05	0.06	0.01	0.01	1.34	0.14	3.38	5.15	8.54
50	1.51	0.13	0.19	0.05	0.06	0.01	0.01	1.46	0.16	3.59	5.64	9.24

Table VOC CARS 34
Economic Cost of Operation of Cars on Four Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.14	0.12	0.10	0.02	0.01	0.06	0.03	0.77	0.08	2.35	2.97	5.34
5	1.16	0.12	0.11	0.03	0.02	0.06	0.03	0.81	0.09	2.43	3.12	5.58
10	1.18	0.12	0.12	0.03	0.02	0.06	0.03	0.85	0.09	2.52	3.30	5.85
15	1.21	0.12	0.13	0.03	0.03	0.06	0.03	0.90	0.10	2.62	3.49	6.14
20	1.24	0.12	0.14	0.04	0.03	0.06	0.03	0.96	0.10	2.74	3.71	6.47
25	1.28	0.12	0.15	0.04	0.04	0.06	0.03	1.02	0.11	2.86	3.95	6.84
30	1.32	0.13	0.16	0.04	0.04	0.06	0.03	1.10	0.12	3.00	4.23	7.26
35	1.36	0.13	0.17	0.05	0.05	0.06	0.03	1.18	0.13	3.16	4.56	7.74
40	1.41	0.13	0.18	0.05	0.05	0.06	0.03	1.28	0.14	3.33	4.93	8.29
45	1.46	0.13	0.19	0.05	0.06	0.06	0.03	1.39	0.15	3.53	5.38	8.94
50	1.52	0.13	0.20	0.05	0.06	0.06	0.03	1.53	0.17	3.77	5.91	9.70

Table VOC CARS 35
Economic Cost of Operation of Cars on Four Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.13	0.12	0.11	0.03	0.01	0.13	0.07	0.79	0.09	2.46	3.04	5.56
5	1.15	0.12	0.11	0.03	0.02	0.13	0.07	0.83	0.09	2.55	3.20	5.81
10	1.18	0.12	0.12	0.03	0.02	0.13	0.07	0.88	0.10	2.65	3.39	6.09
15	1.21	0.12	0.13	0.03	0.03	0.13	0.07	0.93	0.10	2.75	3.59	6.40
20	1.24	0.13	0.14	0.04	0.03	0.13	0.07	0.99	0.11	2.87	3.82	6.75
25	1.28	0.13	0.15	0.04	0.04	0.13	0.07	1.06	0.11	3.00	4.08	7.14
30	1.32	0.13	0.16	0.04	0.04	0.13	0.07	1.14	0.12	3.15	4.38	7.58
35	1.36	0.13	0.17	0.05	0.05	0.13	0.07	1.23	0.13	3.31	4.73	8.10
40	1.41	0.13	0.18	0.05	0.05	0.13	0.07	1.33	0.14	3.50	5.14	8.69
45	1.47	0.13	0.19	0.05	0.06	0.13	0.07	1.46	0.16	3.72	5.62	9.39
50	1.54	0.14	0.20	0.06	0.06	0.13	0.07	1.61	0.17	3.97	6.20	10.23

Table VOC CARS 36
Economic Cost of Operation of Cars on Four Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.12	0.12	0.11	0.03	0.01	0.19	0.10	0.81	0.09	2.58	3.12	5.78
5	1.14	0.13	0.12	0.03	0.02	0.19	0.10	0.85	0.09	2.67	3.29	6.04
10	1.17	0.13	0.13	0.03	0.02	0.19	0.10	0.90	0.10	2.77	3.48	6.34
15	1.20	0.13	0.14	0.04	0.03	0.19	0.10	0.96	0.10	2.88	3.70	6.66
20	1.24	0.13	0.14	0.04	0.03	0.19	0.10	1.02	0.11	3.01	3.94	7.03
25	1.27	0.13	0.15	0.04	0.04	0.19	0.10	1.09	0.12	3.15	4.22	7.45
30	1.32	0.13	0.16	0.05	0.04	0.19	0.10	1.18	0.13	3.30	4.54	7.93
35	1.37	0.14	0.17	0.05	0.05	0.19	0.10	1.27	0.14	3.48	4.92	8.47
40	1.42	0.14	0.18	0.05	0.05	0.19	0.10	1.39	0.15	3.68	5.36	9.12
45	1.48	0.14	0.19	0.05	0.06	0.19	0.10	1.53	0.17	3.91	5.89	9.88
50	1.55	0.14	0.20	0.06	0.06	0.19	0.10	1.69	0.18	4.18	6.53	10.79

Table VOC CARS 37
Economic Cost of Operation of Cars on Four Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.11	0.13	0.11	0.03	0.01	0.25	0.14	0.83	0.09	2.70	3.20	6.01
5	1.14	0.13	0.12	0.03	0.02	0.25	0.14	0.88	0.09	2.80	3.38	6.28
10	1.16	0.13	0.13	0.03	0.02	0.25	0.14	0.93	0.10	2.90	3.58	6.59
15	1.20	0.13	0.14	0.04	0.03	0.25	0.14	0.99	0.11	3.02	3.81	6.94
20	1.23	0.13	0.15	0.04	0.03	0.25	0.14	1.06	0.11	3.15	4.07	7.33
25	1.28	0.14	0.16	0.04	0.04	0.25	0.14	1.13	0.12	3.30	4.37	7.77
30	1.32	0.14	0.17	0.05	0.04	0.25	0.14	1.22	0.13	3.46	4.71	8.28
35	1.37	0.14	0.18	0.05	0.05	0.25	0.14	1.33	0.14	3.65	5.12	8.87
40	1.43	0.14	0.18	0.05	0.05	0.25	0.14	1.45	0.16	3.86	5.60	9.57
45	1.49	0.14	0.19	0.06	0.06	0.25	0.14	1.60	0.17	4.11	6.18	10.40
50	1.57	0.15	0.20	0.06	0.06	0.25	0.14	1.79	0.19	4.41	6.89	11.41

Table VOC CARS 38
Economic Cost of Operation of Cars on Four Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.10	0.13	0.11	0.03	0.01	0.31	0.17	0.85	0.09	2.82	3.28	6.24
5	1.13	0.13	0.12	0.03	0.02	0.31	0.17	0.90	0.10	2.92	3.47	6.53
10	1.16	0.14	0.13	0.04	0.02	0.31	0.17	0.96	0.10	3.03	3.69	6.86
15	1.19	0.14	0.14	0.04	0.03	0.31	0.17	1.02	0.11	3.16	3.93	7.22
20	1.23	0.14	0.15	0.04	0.03	0.31	0.17	1.09	0.12	3.29	4.21	7.64
25	1.28	0.14	0.16	0.05	0.04	0.31	0.17	1.17	0.13	3.45	4.53	8.11
30	1.33	0.14	0.17	0.05	0.04	0.31	0.17	1.27	0.14	3.62	4.90	8.66
35	1.38	0.15	0.18	0.05	0.05	0.31	0.17	1.38	0.15	3.82	5.34	9.30
40	1.44	0.15	0.19	0.05	0.05	0.31	0.17	1.52	0.16	4.05	5.86	10.05
45	1.51	0.15	0.20	0.06	0.06	0.31	0.17	1.69	0.18	4.33	6.50	10.96
50	1.58	0.15	0.21	0.06	0.06	0.31	0.17	1.89	0.20	4.65	7.29	12.08

Table VOC CARS 39
Economic Cost of Operation of Cars on Four Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.10	0.14	0.11	0.03	0.01	0.38	0.21	0.87	0.09	2.94	3.37	6.48
5	1.12	0.14	0.12	0.03	0.02	0.38	0.21	0.93	0.10	3.05	3.57	6.79
10	1.16	0.14	0.13	0.04	0.02	0.38	0.21	0.99	0.11	3.17	3.80	7.13
15	1.19	0.14	0.14	0.04	0.03	0.38	0.21	1.05	0.11	3.30	4.06	7.52
20	1.23	0.14	0.15	0.04	0.03	0.38	0.21	1.13	0.12	3.44	4.35	7.96
25	1.28	0.15	0.16	0.05	0.04	0.38	0.21	1.22	0.13	3.61	4.70	8.47
30	1.33	0.15	0.17	0.05	0.04	0.38	0.21	1.32	0.14	3.79	5.10	9.06
35	1.39	0.15	0.18	0.05	0.05	0.38	0.21	1.45	0.16	4.01	5.58	9.75
40	1.45	0.15	0.19	0.06	0.05	0.38	0.21	1.60	0.17	4.26	6.15	10.57
45	1.52	0.16	0.20	0.06	0.06	0.38	0.21	1.78	0.19	4.55	6.86	11.57
50	1.61	0.16	0.21	0.06	0.06	0.38	0.21	2.01	0.22	4.91	7.75	12.82

Table VOC CARS 40
Economic Cost of Operation of Cars on Four Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.09	0.14	0.12	0.03	0.01	0.44	0.24	0.90	0.10	3.07	3.46	6.73
5	1.12	0.14	0.13	0.04	0.02	0.44	0.24	0.95	0.10	3.18	3.68	7.05
10	1.15	0.15	0.13	0.04	0.02	0.44	0.24	1.02	0.11	3.31	3.92	7.42
15	1.19	0.15	0.14	0.04	0.03	0.44	0.24	1.09	0.12	3.44	4.19	7.83
20	1.24	0.15	0.15	0.05	0.03	0.44	0.24	1.17	0.13	3.60	4.51	8.30
25	1.28	0.15	0.16	0.05	0.04	0.44	0.24	1.27	0.14	3.77	4.88	8.84
30	1.34	0.16	0.17	0.05	0.04	0.44	0.24	1.38	0.15	3.97	5.32	9.48
35	1.40	0.16	0.18	0.05	0.05	0.44	0.24	1.51	0.16	4.20	5.84	10.23
40	1.47	0.16	0.19	0.06	0.05	0.44	0.24	1.68	0.18	4.47	6.47	11.13
45	1.54	0.16	0.20	0.06	0.06	0.44	0.24	1.88	0.20	4.79	7.26	12.24
50	1.63	0.17	0.21	0.06	0.06	0.44	0.24	2.14	0.23	5.19	8.26	13.65

Table VOC CARS 41
Economic Cost of Operation of Cars on Four Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.08	0.15	0.12	0.03	0.01	0.50	0.28	0.92	0.10	3.20	3.56	6.98
5	1.12	0.15	0.13	0.04	0.02	0.50	0.28	0.98	0.11	3.32	3.79	7.33
10	1.15	0.15	0.14	0.04	0.02	0.50	0.28	1.05	0.11	3.45	4.05	7.71
15	1.19	0.15	0.15	0.04	0.03	0.50	0.28	1.13	0.12	3.59	4.34	8.15
20	1.24	0.16	0.16	0.05	0.03	0.50	0.28	1.21	0.13	3.76	4.68	8.66
25	1.29	0.16	0.16	0.05	0.04	0.50	0.28	1.32	0.14	3.94	5.08	9.24
30	1.35	0.16	0.17	0.05	0.04	0.50	0.28	1.44	0.16	4.15	5.55	9.93
35	1.41	0.16	0.18	0.06	0.05	0.50	0.28	1.59	0.17	4.40	6.12	10.74
40	1.48	0.17	0.19	0.06	0.05	0.50	0.28	1.77	0.19	4.70	6.83	11.74
45	1.56	0.17	0.20	0.06	0.06	0.50	0.28	2.00	0.22	5.05	7.71	12.98
50	1.66	0.17	0.21	0.07	0.06	0.50	0.28	2.30	0.25	5.50	8.85	14.57

Table VOC CARS 42
Financial Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.25	0.22	0.23	0.06	0.03	0.06	0.03	1.00	0.19	4.07	2.83	6.90
5	2.35	0.22	0.25	0.07	0.04	0.06	0.03	1.05	0.20	4.27	2.99	7.26
10	2.46	0.22	0.27	0.07	0.05	0.06	0.03	1.12	0.21	4.49	3.16	7.65
15	2.57	0.22	0.29	0.08	0.06	0.06	0.03	1.18	0.23	4.72	3.36	8.08
20	2.69	0.23	0.31	0.09	0.07	0.06	0.03	1.26	0.24	4.98	3.58	8.56
25	2.82	0.23	0.33	0.09	0.08	0.06	0.03	1.35	0.26	5.25	3.83	9.08
30	2.96	0.23	0.35	0.10	0.09	0.06	0.03	1.45	0.28	5.56	4.12	9.67
35	3.11	0.24	0.37	0.11	0.10	0.06	0.03	1.57	0.30	5.89	4.46	10.34
40	3.28	0.24	0.38	0.11	0.12	0.06	0.03	1.71	0.33	6.26	4.85	11.11
45	3.46	0.25	0.40	0.12	0.13	0.06	0.03	1.88	0.36	6.68	5.33	12.01
50	3.65	0.25	0.42	0.12	0.14	0.06	0.03	2.09	0.40	7.16	5.91	13.07

Table VOC CARS 43
Financial Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.23	0.25	0.25	0.07	0.03	0.11	0.06	1.04	0.20	4.25	2.96	7.21
5	2.34	0.25	0.27	0.08	0.04	0.11	0.06	1.10	0.21	4.46	3.13	7.59
10	2.45	0.26	0.29	0.09	0.05	0.11	0.06	1.17	0.22	4.70	3.32	8.02
15	2.57	0.26	0.30	0.09	0.06	0.11	0.06	1.25	0.24	4.95	3.54	8.49
20	2.70	0.26	0.32	0.10	0.07	0.11	0.06	1.34	0.26	5.22	3.78	9.00
25	2.84	0.27	0.34	0.10	0.08	0.11	0.06	1.44	0.27	5.52	4.07	9.59
30	2.98	0.27	0.36	0.11	0.09	0.11	0.06	1.55	0.30	5.85	4.40	10.24
35	3.15	0.28	0.38	0.12	0.10	0.11	0.06	1.69	0.32	6.21	4.78	10.99
40	3.32	0.28	0.40	0.12	0.12	0.11	0.06	1.85	0.35	6.62	5.24	11.87
45	3.52	0.29	0.42	0.13	0.13	0.11	0.06	2.05	0.39	7.09	5.80	12.90
50	3.73	0.29	0.44	0.14	0.14	0.11	0.06	2.29	0.44	7.64	6.50	14.14

Table VOC CARS 44
Financial Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.21	0.29	0.26	0.09	0.03	0.23	0.12	1.09	0.21	4.54	3.10	7.64
5	2.33	0.30	0.28	0.09	0.04	0.23	0.12	1.16	0.22	4.77	3.29	8.05
10	2.44	0.30	0.30	0.10	0.05	0.23	0.12	1.23	0.24	5.02	3.50	8.52
15	2.57	0.31	0.32	0.10	0.06	0.23	0.12	1.32	0.25	5.29	3.74	9.03
20	2.71	0.31	0.34	0.11	0.07	0.23	0.12	1.42	0.27	5.58	4.02	9.60
25	2.86	0.32	0.36	0.12	0.08	0.23	0.12	1.53	0.29	5.91	4.34	10.24
30	3.01	0.33	0.38	0.12	0.09	0.23	0.12	1.66	0.32	6.27	4.71	10.98
35	3.19	0.33	0.40	0.13	0.10	0.23	0.12	1.82	0.35	6.67	5.16	11.83
40	3.38	0.34	0.42	0.13	0.12	0.23	0.12	2.01	0.39	7.13	5.70	12.83
45	3.59	0.35	0.44	0.14	0.13	0.23	0.12	2.25	0.43	7.67	6.37	14.03
50	3.83	0.36	0.46	0.15	0.14	0.23	0.12	2.55	0.49	8.31	7.21	15.52

Table VOC CARS 45
Financial Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.20	0.35	0.28	0.10	0.03	0.34	0.19	1.15	0.22	4.85	3.25	8.11
5	2.32	0.36	0.30	0.10	0.04	0.34	0.19	1.22	0.23	5.10	3.46	8.56
10	2.45	0.37	0.32	0.11	0.05	0.34	0.19	1.30	0.25	5.37	3.70	9.07
15	2.58	0.38	0.34	0.12	0.06	0.34	0.19	1.40	0.27	5.67	3.97	9.63
20	2.73	0.39	0.36	0.12	0.07	0.34	0.19	1.51	0.29	5.99	4.28	10.27
25	2.88	0.40	0.38	0.13	0.08	0.34	0.19	1.64	0.31	6.34	4.64	10.99
30	3.05	0.41	0.39	0.13	0.09	0.34	0.19	1.79	0.34	6.74	5.08	11.82
35	3.24	0.42	0.41	0.14	0.10	0.34	0.19	1.98	0.38	7.20	5.60	12.80
40	3.45	0.43	0.43	0.15	0.12	0.34	0.19	2.20	0.42	7.72	6.24	13.97
45	3.68	0.44	0.45	0.15	0.13	0.34	0.19	2.49	0.48	8.35	7.05	15.40
50	3.96	0.46	0.47	0.16	0.14	0.34	0.19	2.86	0.55	9.11	8.10	17.21

Table VOC CARS 46
Financial Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.20	0.45	0.30	0.11	0.03	0.45	0.25	1.21	0.23	5.22	3.42	8.64
5	2.32	0.46	0.31	0.12	0.04	0.45	0.25	1.29	0.25	5.49	3.65	9.14
10	2.45	0.48	0.33	0.12	0.05	0.45	0.25	1.38	0.26	5.78	3.92	9.70
15	2.60	0.49	0.35	0.13	0.06	0.45	0.25	1.49	0.29	6.11	4.22	10.33
20	2.75	0.51	0.37	0.13	0.07	0.45	0.25	1.62	0.31	6.46	4.58	11.04
25	2.92	0.53	0.39	0.14	0.08	0.45	0.25	1.76	0.34	6.86	5.00	11.86
30	3.10	0.54	0.41	0.15	0.09	0.45	0.25	1.94	0.37	7.31	5.50	12.81
35	3.31	0.56	0.43	0.15	0.10	0.45	0.25	2.16	0.41	7.83	6.12	13.95
40	3.54	0.58	0.45	0.16	0.12	0.45	0.25	2.44	0.47	8.44	6.90	15.35
45	3.80	0.61	0.47	0.16	0.13	0.45	0.25	2.79	0.53	9.19	7.90	17.09
50	4.12	0.63	0.49	0.17	0.14	0.45	0.25	3.26	0.62	10.13	9.25	19.38

Table VOC CARS 47
Financial Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.20	0.62	0.31	0.12	0.03	0.56	0.31	1.28	0.24	5.67	3.61	9.28
5	2.33	0.65	0.33	0.13	0.04	0.56	0.31	1.37	0.26	5.97	3.87	9.84
10	2.47	0.67	0.35	0.13	0.05	0.56	0.31	1.47	0.28	6.30	4.17	10.47
15	2.62	0.70	0.37	0.14	0.06	0.56	0.31	1.59	0.30	6.67	4.51	11.18
20	2.79	0.74	0.39	0.15	0.07	0.56	0.31	1.74	0.33	7.07	4.92	11.99
25	2.97	0.77	0.41	0.15	0.08	0.56	0.31	1.91	0.37	7.53	5.41	12.94
30	3.17	0.81	0.43	0.16	0.09	0.56	0.31	2.12	0.41	8.06	6.01	14.07
35	3.39	0.86	0.45	0.16	0.10	0.56	0.31	2.38	0.46	8.68	6.76	15.43
40	3.65	0.90	0.47	0.17	0.12	0.56	0.31	2.72	0.52	9.42	7.71	17.14
45	3.96	0.96	0.48	0.18	0.13	0.56	0.31	3.17	0.61	10.36	8.99	19.35
50	4.34	1.02	0.50	0.18	0.14	0.56	0.31	3.80	0.73	11.58	10.77	22.35

Table VOC CARS 48
Financial Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.20	1.00	0.33	0.13	0.03	0.68	0.37	1.35	0.26	6.34	3.82	10.17
5	2.34	1.06	0.35	0.14	0.04	0.68	0.37	1.45	0.28	6.71	4.11	10.82
10	2.49	1.14	0.37	0.15	0.05	0.68	0.37	1.57	0.30	7.11	4.45	11.56
15	2.66	1.23	0.39	0.15	0.06	0.68	0.37	1.71	0.33	7.57	4.85	12.41
20	2.83	1.33	0.40	0.16	0.07	0.68	0.37	1.88	0.36	8.08	5.32	13.40
25	3.03	1.45	0.42	0.16	0.08	0.68	0.37	2.08	0.40	8.68	5.90	14.58
30	3.25	1.60	0.44	0.17	0.09	0.68	0.37	2.34	0.45	9.39	6.62	16.00
35	3.50	1.78	0.46	0.18	0.10	0.68	0.37	2.66	0.51	10.24	7.53	17.77
40	3.80	2.00	0.48	0.18	0.12	0.68	0.37	3.09	0.59	11.30	8.74	20.05
45	4.16	2.29	0.50	0.19	0.13	0.68	0.37	3.68	0.70	12.70	10.42	23.12
50	4.64	2.68	0.52	0.19	0.14	0.68	0.37	4.55	0.87	14.64	12.89	27.53

Table VOC CARS 49
Financial Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.21	1.34	0.34	0.14	0.03	0.79	0.43	1.43	0.27	7.00	4.06	11.06
5	2.36	1.46	0.36	0.15	0.04	0.79	0.43	1.55	0.30	7.44	4.39	11.83
10	2.52	1.61	0.38	0.16	0.05	0.79	0.43	1.69	0.32	7.95	4.77	12.73
15	2.70	1.79	0.40	0.16	0.06	0.79	0.43	1.85	0.35	8.54	5.23	13.77
20	2.89	2.02	0.42	0.17	0.07	0.79	0.43	2.04	0.39	9.23	5.79	15.02
25	3.11	2.31	0.44	0.18	0.08	0.79	0.43	2.29	0.44	10.07	6.48	16.55
30	3.35	2.43	0.46	0.18	0.09	0.79	0.43	2.60	0.50	10.83	7.36	18.19
35	3.64	2.61	0.48	0.19	0.10	0.79	0.43	3.00	0.58	11.82	8.51	20.33
40	3.99	2.61	0.50	0.19	0.12	0.79	0.43	3.56	0.68	12.87	10.09	22.96
45	4.44	2.61	0.52	0.20	0.13	0.79	0.43	4.37	0.84	14.33	12.39	26.72
50	5.09	2.61	0.54	0.21	0.14	0.79	0.43	5.67	1.08	16.54	16.05	32.60

Table VOC CARS 50
Financial Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.23	2.61	0.36	0.16	0.03	0.90	0.49	1.53	0.29	8.60	4.33	12.93
5	2.39	2.61	0.38	0.16	0.04	0.90	0.49	1.66	0.32	8.95	4.70	13.66
10	2.56	2.61	0.40	0.17	0.05	0.90	0.49	1.82	0.35	9.35	5.15	14.50
15	2.75	2.61	0.42	0.18	0.06	0.90	0.49	2.01	0.38	9.80	5.69	15.49
20	2.97	2.61	0.44	0.18	0.07	0.90	0.49	2.24	0.43	10.33	6.35	16.68
25	3.21	2.61	0.46	0.19	0.08	0.90	0.49	2.54	0.49	10.96	7.19	18.15
30	3.48	2.61	0.48	0.19	0.09	0.90	0.49	2.93	0.56	11.74	8.29	20.03
35	3.82	2.61	0.49	0.20	0.10	0.90	0.49	3.45	0.66	12.74	9.78	22.52
40	4.25	2.61	0.51	0.21	0.12	0.90	0.49	4.21	0.81	14.11	11.93	26.04
45	4.85	2.61	0.53	0.21	0.13	0.90	0.49	5.40	1.03	16.15	15.29	31.44
50	5.81	2.61	0.55	0.22	0.14	0.90	0.49	7.51	1.44	19.67	21.27	40.94

Table VOC CARS 51
Financial Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 11000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.26	2.61	0.38	0.17	0.03	1.01	0.56	1.64	0.31	8.96	4.64	13.60
5	2.43	2.61	0.40	0.17	0.04	1.01	0.56	1.79	0.34	9.35	5.07	14.42
10	2.62	2.61	0.41	0.18	0.05	1.01	0.56	1.97	0.38	9.79	5.59	15.38
15	2.83	2.61	0.43	0.19	0.06	1.01	0.56	2.20	0.42	10.30	6.23	16.53
20	3.06	2.61	0.45	0.19	0.07	1.01	0.56	2.48	0.48	10.91	7.04	17.95
25	3.33	2.61	0.47	0.20	0.08	1.01	0.56	2.85	0.55	11.66	8.08	19.74
30	3.66	2.61	0.49	0.21	0.09	1.01	0.56	3.35	0.64	12.62	9.49	22.11
35	4.07	2.61	0.51	0.21	0.10	1.01	0.56	4.06	0.78	13.91	11.50	25.41
40	4.63	2.61	0.53	0.22	0.12	1.01	0.56	5.15	0.99	15.81	14.59	30.40
45	5.51	2.61	0.55	0.22	0.13	1.01	0.56	7.04	1.35	18.97	19.95	38.92
50	7.23	2.61	0.57	0.23	0.14	1.01	0.56	11.12	2.13	25.59	31.51	57.10

Table VOC CARS 52
Financial Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 12000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.30	2.61	0.39	0.18	0.03	1.13	0.62	1.76	0.34	9.35	4.99	14.34
5	2.48	2.61	0.41	0.19	0.04	1.13	0.62	1.94	0.37	9.78	5.49	15.27
10	2.69	2.61	0.43	0.19	0.05	1.13	0.62	2.16	0.41	10.28	6.11	16.39
15	2.91	2.61	0.45	0.20	0.06	1.13	0.62	2.43	0.47	10.87	6.89	17.76
20	3.18	2.61	0.47	0.20	0.07	1.13	0.62	2.78	0.53	11.59	7.88	19.47
25	3.49	2.61	0.49	0.21	0.08	1.13	0.62	3.25	0.62	12.50	9.22	21.73
30	3.89	2.61	0.51	0.22	0.09	1.13	0.62	3.92	0.75	13.73	11.11	24.83
35	4.42	2.61	0.53	0.22	0.10	1.13	0.62	4.93	0.94	15.49	13.96	29.45
40	5.22	2.61	0.55	0.23	0.12	1.13	0.62	6.63	1.27	18.36	18.78	37.13
45	6.72	2.61	0.57	0.24	0.13	1.13	0.62	10.13	1.94	24.06	28.69	52.75
50	8.46	2.61	0.59	0.24	0.14	1.13	0.62	14.24	2.73	30.75	40.35	71.10

Table VOC CARS 53
Financial Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 13000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.35	2.61	0.41	0.19	0.03	1.24	0.68	1.91	0.36	9.77	5.40	15.17
5	2.55	2.61	0.43	0.20	0.04	1.24	0.68	2.12	0.41	10.26	6.00	16.26
10	2.77	2.61	0.45	0.20	0.05	1.24	0.68	2.38	0.46	10.83	6.74	17.57
15	3.03	2.61	0.47	0.21	0.06	1.24	0.68	2.72	0.52	11.53	7.69	19.22
20	3.33	2.61	0.49	0.22	0.07	1.24	0.68	3.16	0.61	12.40	8.96	21.36
25	3.71	2.61	0.51	0.22	0.08	1.24	0.68	3.79	0.73	13.56	10.73	24.29
30	4.21	2.61	0.52	0.23	0.09	1.24	0.68	4.72	0.90	15.21	13.37	28.58
35	4.95	2.61	0.54	0.24	0.10	1.24	0.68	6.26	1.20	17.82	17.74	35.55
40	6.27	2.61	0.56	0.24	0.12	1.24	0.68	9.29	1.78	22.78	26.33	49.11
45	7.97	2.61	0.58	0.25	0.13	1.24	0.68	13.29	2.54	29.29	37.66	66.95
50	8.77	2.61	0.60	0.25	0.14	1.24	0.68	14.96	2.86	32.10	42.37	74.48

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Table VOC CARS 54
Financial Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 14000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.41	2.61	0.43	0.20	0.03	1.35	0.74	2.08	0.40	10.24	5.89	16.13
5	2.63	2.61	0.44	0.21	0.04	1.35	0.74	2.33	0.45	10.80	6.60	17.40
10	2.88	2.61	0.46	0.22	0.05	1.35	0.74	2.65	0.51	11.47	7.51	18.98
15	3.17	2.61	0.48	0.22	0.06	1.35	0.74	3.08	0.59	12.31	8.72	21.02
20	3.53	2.61	0.50	0.23	0.07	1.35	0.74	3.67	0.70	13.40	10.39	23.79
25	4.01	2.61	0.52	0.23	0.08	1.35	0.74	4.53	0.87	14.95	12.84	27.78
30	4.69	2.61	0.54	0.24	0.09	1.35	0.74	5.93	1.14	17.34	16.81	34.14
35	5.87	2.61	0.56	0.25	0.10	1.35	0.74	8.59	1.64	21.71	24.33	46.04
40	8.71	2.61	0.58	0.25	0.12	1.35	0.74	15.55	2.98	32.87	44.05	76.92
45	9.28	2.61	0.60	0.26	0.13	1.35	0.74	16.62	3.18	34.76	47.08	81.84
50	9.82	2.61	0.62	0.27	0.14	1.35	0.74	17.60	3.37	36.50	49.85	86.35

Table VOC CARS 55
Financial Cost of Operation of Cars on Single Lane Roads (Rs/km)

Roughness = 15000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.48	2.61	0.44	0.22	0.03	1.46	0.80	2.28	0.44	10.76	6.47	17.23
5	2.73	2.61	0.46	0.22	0.04	1.46	0.80	2.59	0.50	11.41	7.34	18.75
10	3.02	2.61	0.48	0.23	0.05	1.46	0.80	3.00	0.57	12.22	8.49	20.71
15	3.36	2.61	0.50	0.23	0.06	1.46	0.80	3.55	0.68	13.26	10.06	23.32
20	3.81	2.61	0.52	0.24	0.07	1.46	0.80	4.36	0.83	14.71	12.34	27.05
25	4.45	2.61	0.54	0.25	0.08	1.46	0.80	5.64	1.08	16.91	15.97	32.88
30	5.50	2.61	0.56	0.25	0.09	1.46	0.80	7.98	1.53	20.79	22.61	43.40
35	7.85	2.61	0.58	0.26	0.10	1.46	0.80	13.67	2.62	29.95	38.72	68.67
40	9.15	2.61	0.60	0.26	0.12	1.46	0.80	16.62	3.18	34.80	47.08	81.88
45	9.69	2.61	0.61	0.27	0.13	1.46	0.80	17.60	3.37	36.53	49.85	86.38
50	10.27	2.61	0.63	0.28	0.14	1.46	0.80	18.70	3.58	38.46	52.96	91.43

Table VOC CARS 56
Financial Cost of Operation of Cars on Intermediate Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.39	0.20	0.22	0.05	0.03	0.03	0.02	0.91	0.17	4.02	2.57	6.59
5	2.47	0.20	0.24	0.06	0.04	0.03	0.02	0.96	0.18	4.20	2.71	6.91
10	2.56	0.20	0.26	0.07	0.05	0.03	0.02	1.01	0.19	4.39	2.86	7.25
15	2.66	0.21	0.28	0.07	0.06	0.03	0.02	1.07	0.20	4.60	3.02	7.63
20	2.76	0.21	0.30	0.08	0.07	0.03	0.02	1.13	0.22	4.83	3.21	8.04
25	2.88	0.21	0.32	0.09	0.08	0.03	0.02	1.21	0.23	5.07	3.43	8.49
30	3.00	0.21	0.34	0.09	0.09	0.03	0.02	1.30	0.25	5.33	3.67	9.00
35	3.13	0.22	0.35	0.10	0.10	0.03	0.02	1.39	0.27	5.62	3.95	9.57
40	3.28	0.22	0.37	0.10	0.12	0.03	0.02	1.51	0.29	5.94	4.28	10.22
45	3.44	0.22	0.39	0.11	0.13	0.03	0.02	1.65	0.32	6.30	4.67	10.97
50	3.61	0.23	0.41	0.12	0.14	0.03	0.02	1.81	0.35	6.71	5.13	11.84

Table VOC CARS 57
Financial Cost of Operation of Cars on Intermediate Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.37	0.22	0.23	0.06	0.03	0.11	0.06	0.94	0.18	4.20	2.65	6.85
5	2.46	0.22	0.25	0.07	0.04	0.11	0.06	0.99	0.19	4.39	2.80	7.18
10	2.55	0.22	0.27	0.08	0.05	0.11	0.06	1.04	0.20	4.59	2.96	7.54
15	2.65	0.23	0.29	0.08	0.06	0.11	0.06	1.11	0.21	4.80	3.14	7.94
20	2.76	0.23	0.31	0.09	0.07	0.11	0.06	1.18	0.23	5.04	3.34	8.38
25	2.88	0.23	0.33	0.09	0.08	0.11	0.06	1.26	0.24	5.30	3.57	8.87
30	3.01	0.24	0.35	0.10	0.09	0.11	0.06	1.35	0.26	5.58	3.84	9.41
35	3.15	0.24	0.37	0.11	0.10	0.11	0.06	1.46	0.28	5.89	4.15	10.03
40	3.30	0.24	0.39	0.11	0.12	0.11	0.06	1.59	0.30	6.23	4.51	10.74
45	3.47	0.25	0.40	0.12	0.13	0.11	0.06	1.74	0.33	6.62	4.94	11.56
50	3.65	0.25	0.42	0.12	0.14	0.11	0.06	1.93	0.37	7.06	5.46	12.52

Table VOC CARS 58
Financial Cost of Operation of Cars on Intermediate Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.35	0.24	0.24	0.07	0.03	0.23	0.12	0.97	0.19	4.43	2.74	7.17
5	2.45	0.24	0.26	0.08	0.04	0.23	0.12	1.02	0.20	4.63	2.89	7.52
10	2.55	0.25	0.28	0.08	0.05	0.23	0.12	1.08	0.21	4.84	3.06	7.91
15	2.65	0.25	0.30	0.09	0.06	0.23	0.12	1.15	0.22	5.07	3.26	8.33
20	2.77	0.25	0.32	0.10	0.07	0.23	0.12	1.23	0.23	5.32	3.48	8.80
25	2.89	0.26	0.34	0.10	0.08	0.23	0.12	1.32	0.25	5.59	3.73	9.32
30	3.03	0.26	0.36	0.11	0.09	0.23	0.12	1.42	0.27	5.89	4.02	9.91
35	3.18	0.27	0.38	0.11	0.10	0.23	0.12	1.54	0.29	6.22	4.36	10.58
40	3.34	0.27	0.40	0.12	0.12	0.23	0.12	1.68	0.32	6.59	4.76	11.35
45	3.51	0.27	0.42	0.13	0.13	0.23	0.12	1.85	0.35	7.01	5.25	12.26
50	3.71	0.28	0.43	0.13	0.14	0.23	0.12	2.06	0.39	7.50	5.84	13.34

Table VOC CARS 59
Financial Cost of Operation of Cars on Intermediate Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.34	0.26	0.25	0.08	0.03	0.34	0.19	1.00	0.19	4.68	2.83	7.51
5	2.44	0.27	0.27	0.09	0.04	0.34	0.19	1.06	0.20	4.89	2.99	7.88
10	2.54	0.27	0.29	0.09	0.05	0.34	0.19	1.12	0.21	5.11	3.18	8.29
15	2.65	0.28	0.31	0.10	0.06	0.34	0.19	1.20	0.23	5.35	3.39	8.74
20	2.78	0.28	0.33	0.10	0.07	0.34	0.19	1.28	0.25	5.61	3.63	9.24
25	2.91	0.29	0.35	0.11	0.08	0.34	0.19	1.38	0.26	5.90	3.90	9.80
30	3.05	0.29	0.37	0.12	0.09	0.34	0.19	1.49	0.29	6.22	4.22	10.44
35	3.20	0.30	0.39	0.12	0.10	0.34	0.19	1.62	0.31	6.57	4.60	11.17
40	3.37	0.30	0.41	0.13	0.12	0.34	0.19	1.78	0.34	6.97	5.05	12.02
45	3.56	0.31	0.43	0.13	0.13	0.34	0.19	1.97	0.38	7.43	5.59	13.03
50	3.77	0.32	0.45	0.14	0.14	0.34	0.19	2.22	0.42	7.97	6.28	14.25

Table VOC CARS 60
Financial Cost of Operation of Cars on Intermediate Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.33	0.30	0.26	0.09	0.03	0.45	0.25	1.03	0.20	4.94	2.93	7.87
5	2.43	0.30	0.28	0.09	0.04	0.45	0.25	1.10	0.21	5.15	3.11	8.26
10	2.54	0.31	0.30	0.10	0.05	0.45	0.25	1.17	0.22	5.39	3.30	8.69
15	2.66	0.31	0.32	0.11	0.06	0.45	0.25	1.25	0.24	5.64	3.53	9.17
20	2.79	0.32	0.34	0.11	0.07	0.45	0.25	1.34	0.26	5.92	3.79	9.71
25	2.92	0.33	0.36	0.12	0.08	0.45	0.25	1.44	0.28	6.23	4.09	10.32
30	3.07	0.33	0.38	0.12	0.09	0.45	0.25	1.57	0.30	6.57	4.44	11.01
35	3.24	0.34	0.40	0.13	0.10	0.45	0.25	1.72	0.33	6.95	4.86	11.82
40	3.42	0.35	0.42	0.14	0.12	0.45	0.25	1.89	0.36	7.39	5.37	12.76
45	3.62	0.36	0.44	0.14	0.13	0.45	0.25	2.12	0.40	7.90	5.99	13.89
50	3.85	0.36	0.46	0.15	0.14	0.45	0.25	2.39	0.46	8.50	6.78	15.28

Table VOC CARS 61
Financial Cost of Operation of Cars on Intermediate Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.32	0.34	0.28	0.10	0.03	0.56	0.31	1.07	0.21	5.21	3.03	8.24
5	2.43	0.34	0.29	0.10	0.04	0.56	0.31	1.14	0.22	5.44	3.22	8.66
10	2.54	0.35	0.31	0.11	0.05	0.56	0.31	1.21	0.23	5.69	3.44	9.13
15	2.67	0.36	0.33	0.11	0.06	0.56	0.31	1.30	0.25	5.96	3.68	9.64
20	2.80	0.37	0.35	0.12	0.07	0.56	0.31	1.40	0.27	6.26	3.97	10.22
25	2.95	0.38	0.37	0.13	0.08	0.56	0.31	1.52	0.29	6.58	4.30	10.88
30	3.10	0.39	0.39	0.13	0.09	0.56	0.31	1.66	0.32	6.95	4.69	11.64
35	3.28	0.40	0.41	0.14	0.10	0.56	0.31	1.82	0.35	7.37	5.16	12.53
40	3.47	0.41	0.43	0.14	0.12	0.56	0.31	2.02	0.39	7.85	5.73	13.58
45	3.69	0.42	0.45	0.15	0.13	0.56	0.31	2.28	0.44	8.41	6.45	14.86
50	3.94	0.43	0.47	0.16	0.14	0.56	0.31	2.60	0.50	9.10	7.37	16.47

Table VOC CARS 62
Financial Cost of Operation of Cars on Intermediate Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.32	0.39	0.29	0.10	0.03	0.68	0.37	1.11	0.21	5.50	3.15	8.65
5	2.43	0.40	0.31	0.11	0.04	0.68	0.37	1.18	0.23	5.74	3.35	9.10
10	2.55	0.41	0.32	0.12	0.05	0.68	0.37	1.27	0.24	6.01	3.59	9.59
15	2.68	0.42	0.34	0.12	0.06	0.68	0.37	1.36	0.26	6.30	3.85	10.15
20	2.82	0.44	0.36	0.13	0.07	0.68	0.37	1.47	0.28	6.62	4.16	10.78
25	2.97	0.45	0.38	0.13	0.08	0.68	0.37	1.60	0.31	6.97	4.53	11.50
30	3.14	0.46	0.40	0.14	0.09	0.68	0.37	1.75	0.34	7.37	4.97	12.34
35	3.32	0.47	0.42	0.15	0.10	0.68	0.37	1.94	0.37	7.83	5.50	13.32
40	3.53	0.49	0.44	0.15	0.12	0.68	0.37	2.17	0.42	8.36	6.15	14.51
45	3.77	0.50	0.46	0.16	0.13	0.68	0.37	2.47	0.47	9.00	6.99	15.98
50	4.04	0.52	0.48	0.16	0.14	0.68	0.37	2.85	0.55	9.79	8.08	17.87

Table VOC CARS 63
Financial Cost of Operation of Cars on Intermediate Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.32	0.47	0.30	0.11	0.03	0.79	0.43	1.15	0.22	5.82	3.27	9.09
5	2.43	0.48	0.32	0.12	0.04	0.79	0.43	1.23	0.24	6.08	3.49	9.57
10	2.56	0.50	0.34	0.12	0.05	0.79	0.43	1.32	0.25	6.36	3.74	10.11
15	2.70	0.51	0.36	0.13	0.06	0.79	0.43	1.43	0.27	6.68	4.04	10.71
20	2.84	0.53	0.37	0.14	0.07	0.79	0.43	1.55	0.30	7.02	4.38	11.40
25	3.00	0.55	0.39	0.14	0.08	0.79	0.43	1.69	0.32	7.41	4.79	12.19
30	3.18	0.57	0.41	0.15	0.09	0.79	0.43	1.86	0.36	7.85	5.28	13.12
35	3.38	0.59	0.43	0.15	0.10	0.79	0.43	2.08	0.40	8.35	5.88	14.23
40	3.60	0.61	0.45	0.16	0.12	0.79	0.43	2.34	0.45	8.95	6.64	15.59
45	3.86	0.64	0.47	0.17	0.13	0.79	0.43	2.69	0.51	9.69	7.62	17.30
50	4.17	0.66	0.49	0.17	0.14	0.79	0.43	3.15	0.60	10.61	8.94	19.55

Table VOC CARS 64
Financial Cost of Operation of Cars on Intermediate Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.32	0.58	0.31	0.12	0.03	0.90	0.49	1.20	0.23	6.18	3.40	9.59
5	2.44	0.60	0.33	0.13	0.04	0.90	0.49	1.29	0.25	6.47	3.64	10.11
10	2.57	0.63	0.35	0.13	0.05	0.90	0.49	1.38	0.26	6.77	3.92	10.69
15	2.72	0.65	0.37	0.14	0.06	0.90	0.49	1.50	0.29	7.11	4.24	11.35
20	2.87	0.68	0.39	0.14	0.07	0.90	0.49	1.63	0.31	7.49	4.62	12.11
25	3.04	0.71	0.40	0.15	0.08	0.90	0.49	1.79	0.34	7.92	5.08	13.00
30	3.23	0.74	0.42	0.16	0.09	0.90	0.49	1.99	0.38	8.41	5.63	14.04
35	3.44	0.78	0.44	0.16	0.10	0.90	0.49	2.23	0.43	8.99	6.32	15.31
40	3.69	0.82	0.46	0.17	0.12	0.90	0.49	2.54	0.49	9.68	7.20	16.88
45	3.97	0.87	0.48	0.17	0.13	0.90	0.49	2.96	0.57	10.54	8.37	18.91
50	4.33	0.92	0.50	0.18	0.14	0.90	0.49	3.53	0.68	11.66	10.00	21.66

Table VOC CARS 65
Financial Cost of Operation of Cars on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.58	0.19	0.22	0.05	0.03	0.03	0.02	0.82	0.16	4.08	3.11	7.20
5	2.64	0.19	0.23	0.06	0.04	0.03	0.02	0.86	0.16	4.23	3.27	7.51
10	2.71	0.20	0.25	0.06	0.05	0.03	0.02	0.91	0.17	4.40	3.45	7.85
15	2.79	0.20	0.27	0.07	0.06	0.03	0.02	0.96	0.18	4.58	3.65	8.22
20	2.87	0.20	0.29	0.08	0.07	0.03	0.02	1.02	0.19	4.77	3.87	8.63
25	2.97	0.20	0.31	0.08	0.08	0.03	0.02	1.08	0.21	4.98	4.11	9.09
30	3.07	0.21	0.33	0.09	0.09	0.03	0.02	1.15	0.22	5.21	4.40	9.61
35	3.18	0.21	0.35	0.09	0.10	0.03	0.02	1.24	0.24	5.46	4.72	10.18
40	3.31	0.21	0.37	0.10	0.12	0.03	0.02	1.34	0.26	5.74	5.10	10.84
45	3.44	0.22	0.39	0.11	0.13	0.03	0.02	1.45	0.28	6.06	5.54	11.59
50	3.60	0.22	0.41	0.11	0.14	0.03	0.02	1.59	0.30	6.41	6.06	12.47

Table VOC CARS 66
Financial Cost of Operation of Cars on Two Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.56	0.20	0.22	0.06	0.03	0.11	0.06	0.84	0.16	4.25	3.19	7.44
5	2.62	0.21	0.24	0.06	0.04	0.11	0.06	0.88	0.17	4.40	3.36	7.76
10	2.70	0.21	0.26	0.07	0.05	0.11	0.06	0.93	0.18	4.57	3.54	8.12
15	2.78	0.21	0.28	0.08	0.06	0.11	0.06	0.98	0.19	4.76	3.75	8.51
20	2.87	0.22	0.30	0.08	0.07	0.11	0.06	1.05	0.20	4.96	3.98	8.94
25	2.97	0.22	0.32	0.09	0.08	0.11	0.06	1.11	0.21	5.18	4.25	9.43
30	3.08	0.22	0.34	0.09	0.09	0.11	0.06	1.19	0.23	5.42	4.55	9.97
35	3.19	0.22	0.36	0.10	0.10	0.11	0.06	1.29	0.25	5.69	4.89	10.58
40	3.32	0.23	0.38	0.11	0.12	0.11	0.06	1.39	0.27	5.99	5.30	11.28
45	3.47	0.23	0.40	0.11	0.13	0.11	0.06	1.52	0.29	6.32	5.78	12.09
50	3.63	0.23	0.42	0.12	0.14	0.11	0.06	1.67	0.32	6.69	6.35	13.04

Table VOC CARS 67
Financial Cost of Operation of Cars on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.54	0.22	0.23	0.06	0.03	0.23	0.12	0.86	0.16	4.46	3.27	7.73
5	2.61	0.22	0.25	0.07	0.04	0.23	0.12	0.90	0.17	4.62	3.44	8.07
10	2.69	0.23	0.27	0.08	0.05	0.23	0.12	0.96	0.18	4.80	3.64	8.44
15	2.77	0.23	0.29	0.08	0.06	0.23	0.12	1.01	0.19	4.99	3.86	8.85
20	2.87	0.23	0.31	0.09	0.07	0.23	0.12	1.08	0.21	5.20	4.10	9.31
25	2.97	0.24	0.33	0.09	0.08	0.23	0.12	1.15	0.22	5.44	4.39	9.82
30	3.08	0.24	0.35	0.10	0.09	0.23	0.12	1.24	0.24	5.69	4.71	10.40
35	3.21	0.24	0.37	0.11	0.10	0.23	0.12	1.33	0.26	5.97	5.08	11.05
40	3.34	0.25	0.39	0.11	0.12	0.23	0.12	1.45	0.28	6.28	5.52	11.80
45	3.49	0.25	0.41	0.12	0.13	0.23	0.12	1.59	0.30	6.63	6.04	12.67
50	3.66	0.25	0.43	0.13	0.14	0.23	0.12	1.75	0.34	7.04	6.67	13.70

Table VOC CARS 68
Financial Cost of Operation of Cars on Two Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.53	0.24	0.24	0.07	0.03	0.34	0.19	0.88	0.17	4.68	3.35	8.03
5	2.60	0.24	0.26	0.08	0.04	0.34	0.19	0.93	0.18	4.85	3.53	8.38
10	2.68	0.24	0.28	0.08	0.05	0.34	0.19	0.98	0.19	5.03	3.74	8.77
15	2.77	0.25	0.30	0.09	0.06	0.34	0.19	1.04	0.20	5.23	3.97	9.21
20	2.87	0.25	0.32	0.09	0.07	0.34	0.19	1.11	0.21	5.46	4.24	9.69
25	2.98	0.26	0.34	0.10	0.08	0.34	0.19	1.19	0.23	5.70	4.54	10.23
30	3.10	0.26	0.36	0.11	0.09	0.34	0.19	1.28	0.25	5.96	4.88	10.84
35	3.23	0.26	0.38	0.11	0.10	0.34	0.19	1.39	0.27	6.26	5.28	11.54
40	3.37	0.27	0.40	0.12	0.12	0.34	0.19	1.51	0.29	6.59	5.76	12.35
45	3.53	0.27	0.41	0.13	0.13	0.34	0.19	1.66	0.32	6.97	6.33	13.29
50	3.70	0.28	0.43	0.13	0.14	0.34	0.19	1.84	0.35	7.40	7.02	14.42

Table VOC CARS 69
Financial Cost of Operation of Cars on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.51	0.26	0.25	0.08	0.03	0.45	0.25	0.90	0.17	4.90	3.44	8.34
5	2.59	0.26	0.27	0.08	0.04	0.45	0.25	0.95	0.18	5.08	3.63	8.71
10	2.68	0.26	0.29	0.09	0.05	0.45	0.25	1.01	0.19	5.27	3.85	9.12
15	2.77	0.27	0.31	0.10	0.06	0.45	0.25	1.08	0.21	5.48	4.09	9.58
20	2.87	0.27	0.33	0.10	0.07	0.45	0.25	1.15	0.22	5.71	4.37	10.09
25	2.99	0.28	0.35	0.11	0.08	0.45	0.25	1.23	0.24	5.97	4.69	10.66
30	3.11	0.28	0.37	0.11	0.09	0.45	0.25	1.33	0.25	6.25	5.07	11.31
35	3.24	0.29	0.38	0.12	0.10	0.45	0.25	1.44	0.28	6.56	5.50	12.06
40	3.39	0.29	0.40	0.13	0.12	0.45	0.25	1.58	0.30	6.91	6.02	12.93
45	3.56	0.30	0.42	0.13	0.13	0.45	0.25	1.74	0.33	7.32	6.64	13.96
50	3.75	0.30	0.44	0.14	0.14	0.45	0.25	1.95	0.37	7.78	7.41	15.19

Table VOC CARS 70
Financial Cost of Operation of Cars on Two Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.50	0.28	0.26	0.08	0.03	0.56	0.31	0.93	0.18	5.13	3.53	8.66
5	2.58	0.28	0.28	0.09	0.04	0.56	0.31	0.98	0.19	5.32	3.73	9.05
10	2.67	0.29	0.30	0.10	0.05	0.56	0.31	1.04	0.20	5.52	3.96	9.48
15	2.77	0.29	0.32	0.10	0.06	0.56	0.31	1.11	0.21	5.74	4.22	9.96
20	2.88	0.30	0.34	0.11	0.07	0.56	0.31	1.19	0.23	5.98	4.52	10.50
25	3.00	0.31	0.36	0.11	0.08	0.56	0.31	1.28	0.24	6.25	4.87	11.11
30	3.13	0.31	0.37	0.12	0.09	0.56	0.31	1.38	0.26	6.54	5.27	11.81
35	3.27	0.32	0.39	0.13	0.10	0.56	0.31	1.51	0.29	6.88	5.74	12.61
40	3.42	0.32	0.41	0.13	0.12	0.56	0.31	1.65	0.32	7.25	6.30	13.55
45	3.60	0.33	0.43	0.14	0.13	0.56	0.31	1.84	0.35	7.69	6.99	14.67
50	3.80	0.34	0.45	0.14	0.14	0.56	0.31	2.06	0.39	8.19	7.85	16.04

Table VOC CARS 71
Financial Cost of Operation of Cars on Two Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.49	0.31	0.27	0.09	0.03	0.68	0.37	0.95	0.18	5.37	3.62	8.99
5	2.58	0.31	0.29	0.10	0.04	0.68	0.37	1.01	0.19	5.56	3.84	9.40
10	2.67	0.32	0.31	0.10	0.05	0.68	0.37	1.07	0.21	5.77	4.08	9.86
15	2.77	0.33	0.33	0.11	0.06	0.68	0.37	1.15	0.22	6.01	4.36	10.37
20	2.89	0.33	0.34	0.11	0.07	0.68	0.37	1.23	0.24	6.26	4.68	10.94
25	3.01	0.34	0.36	0.12	0.08	0.68	0.37	1.33	0.25	6.54	5.05	11.59
30	3.14	0.35	0.38	0.13	0.09	0.68	0.37	1.44	0.28	6.86	5.48	12.34
35	3.29	0.35	0.40	0.13	0.10	0.68	0.37	1.57	0.30	7.21	6.00	13.21
40	3.46	0.36	0.42	0.14	0.12	0.68	0.37	1.74	0.33	7.61	6.61	14.23
45	3.64	0.37	0.44	0.14	0.13	0.68	0.37	1.94	0.37	8.08	7.38	15.46
50	3.86	0.38	0.46	0.15	0.14	0.68	0.37	2.19	0.42	8.64	8.34	16.97

Table VOC CARS 72
Financial Cost of Operation of Cars on Two Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.49	0.34	0.28	0.10	0.03	0.79	0.43	0.98	0.19	5.62	3.72	9.34
5	2.58	0.35	0.30	0.10	0.04	0.79	0.43	1.04	0.20	5.82	3.95	9.77
10	2.67	0.36	0.31	0.11	0.05	0.79	0.43	1.11	0.21	6.04	4.21	10.26
15	2.78	0.36	0.33	0.11	0.06	0.79	0.43	1.18	0.23	6.29	4.51	10.80
20	2.90	0.37	0.35	0.12	0.07	0.79	0.43	1.27	0.24	6.55	4.85	11.41
25	3.03	0.38	0.37	0.13	0.08	0.79	0.43	1.38	0.26	6.85	5.25	12.10
30	3.17	0.39	0.39	0.13	0.09	0.79	0.43	1.50	0.29	7.19	5.72	12.90
35	3.32	0.40	0.41	0.14	0.10	0.79	0.43	1.65	0.32	7.56	6.28	13.84
40	3.50	0.41	0.43	0.14	0.12	0.79	0.43	1.83	0.35	8.00	6.96	14.96
45	3.69	0.42	0.45	0.15	0.13	0.79	0.43	2.05	0.39	8.51	7.81	16.32
50	3.92	0.43	0.47	0.16	0.14	0.79	0.43	2.34	0.45	9.12	8.89	18.01

Table VOC CARS 73
Financial Cost of Operation of Cars on Two Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.48	0.38	0.28	0.10	0.03	0.90	0.49	1.01	0.19	5.88	3.83	9.71
5	2.57	0.39	0.30	0.11	0.04	0.90	0.49	1.07	0.20	6.09	4.08	10.16
10	2.68	0.40	0.32	0.11	0.05	0.90	0.49	1.14	0.22	6.32	4.35	10.68
15	2.79	0.41	0.34	0.12	0.06	0.90	0.49	1.23	0.23	6.58	4.67	11.25
20	2.91	0.42	0.36	0.13	0.07	0.90	0.49	1.32	0.25	6.87	5.04	11.90
25	3.04	0.44	0.38	0.13	0.08	0.90	0.49	1.44	0.27	7.18	5.47	12.65
30	3.19	0.45	0.40	0.14	0.09	0.90	0.49	1.57	0.30	7.54	5.97	13.51
35	3.36	0.46	0.42	0.14	0.10	0.90	0.49	1.73	0.33	7.94	6.59	14.53
40	3.54	0.48	0.44	0.15	0.12	0.90	0.49	1.93	0.37	8.42	7.34	15.76
45	3.75	0.49	0.46	0.16	0.13	0.90	0.49	2.18	0.42	8.97	8.29	17.27
50	4.00	0.51	0.48	0.16	0.14	0.90	0.49	2.50	0.48	9.66	9.53	19.18

Table VOC CARS 74
Financial Cost of Operation of Cars on Four Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.74	0.18	0.21	0.05	0.03	0.02	0.01	0.76	0.15	4.14	2.90	7.04
5	2.78	0.18	0.23	0.05	0.04	0.02	0.01	0.80	0.15	4.27	3.05	7.32
10	2.84	0.18	0.25	0.06	0.05	0.02	0.01	0.84	0.16	4.41	3.21	7.63
15	2.90	0.19	0.26	0.06	0.06	0.02	0.01	0.89	0.17	4.57	3.39	7.96
20	2.97	0.19	0.28	0.07	0.07	0.02	0.01	0.95	0.18	4.74	3.60	8.34
25	3.04	0.19	0.30	0.08	0.08	0.02	0.01	1.01	0.19	4.93	3.83	8.76
30	3.13	0.19	0.32	0.08	0.09	0.02	0.01	1.07	0.21	5.14	4.09	9.23
35	3.23	0.20	0.34	0.09	0.10	0.02	0.01	1.15	0.22	5.37	4.39	9.77
40	3.34	0.20	0.36	0.09	0.12	0.02	0.01	1.25	0.24	5.63	4.74	10.37
45	3.46	0.20	0.38	0.10	0.13	0.02	0.01	1.35	0.26	5.92	5.15	11.07
50	3.60	0.20	0.40	0.11	0.14	0.02	0.01	1.48	0.28	6.25	5.64	11.89

Table VOC CARS 75
Financial Cost of Operation of Cars on Four Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.71	0.19	0.21	0.05	0.03	0.11	0.06	0.78	0.15	4.29	2.97	7.26
5	2.76	0.19	0.23	0.05	0.04	0.11	0.06	0.82	0.16	4.43	3.12	7.55
10	2.82	0.19	0.25	0.06	0.05	0.11	0.06	0.87	0.17	4.57	3.30	7.87
15	2.88	0.19	0.27	0.07	0.06	0.11	0.06	0.92	0.18	4.74	3.49	8.23
20	2.96	0.20	0.29	0.07	0.07	0.11	0.06	0.97	0.19	4.92	3.71	8.62
25	3.04	0.20	0.31	0.08	0.08	0.11	0.06	1.04	0.20	5.12	3.95	9.07
30	3.13	0.20	0.33	0.08	0.09	0.11	0.06	1.11	0.21	5.34	4.23	9.57
35	3.24	0.20	0.35	0.09	0.10	0.11	0.06	1.20	0.23	5.58	4.56	10.13
40	3.35	0.21	0.37	0.10	0.12	0.11	0.06	1.30	0.25	5.85	4.93	10.78
45	3.48	0.21	0.38	0.10	0.13	0.11	0.06	1.41	0.27	6.16	5.38	11.54
50	3.63	0.21	0.40	0.11	0.14	0.11	0.06	1.55	0.30	6.51	5.91	12.42

Table VOC CARS 76
Financial Cost of Operation of Cars on Four Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.69	0.19	0.22	0.05	0.03	0.23	0.12	0.80	0.15	4.48	3.04	7.52
5	2.74	0.19	0.23	0.06	0.04	0.23	0.12	0.84	0.16	4.62	3.20	7.82
10	2.80	0.20	0.25	0.06	0.05	0.23	0.12	0.89	0.17	4.77	3.39	8.16
15	2.87	0.20	0.27	0.07	0.06	0.23	0.12	0.94	0.18	4.94	3.59	8.53
20	2.95	0.20	0.29	0.08	0.07	0.23	0.12	1.00	0.19	5.13	3.82	8.95
25	3.03	0.20	0.31	0.08	0.08	0.23	0.12	1.07	0.21	5.34	4.08	9.42
30	3.13	0.21	0.33	0.09	0.09	0.23	0.12	1.15	0.22	5.57	4.38	9.95
35	3.24	0.21	0.35	0.09	0.10	0.23	0.12	1.24	0.24	5.83	4.73	10.56
40	3.36	0.21	0.37	0.10	0.12	0.23	0.12	1.35	0.26	6.12	5.14	11.25
45	3.50	0.22	0.39	0.11	0.13	0.23	0.12	1.48	0.28	6.44	5.62	12.06
50	3.65	0.22	0.41	0.11	0.14	0.23	0.12	1.63	0.31	6.82	6.20	13.02

Table VOC CARS 77
Financial Cost of Operation of Cars on Four Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.67	0.20	0.22	0.05	0.03	0.34	0.19	0.82	0.16	4.67	3.12	7.78
5	2.72	0.20	0.24	0.06	0.04	0.34	0.19	0.86	0.17	4.81	3.29	8.10
10	2.78	0.20	0.26	0.07	0.05	0.34	0.19	0.91	0.17	4.98	3.48	8.46
15	2.86	0.21	0.28	0.07	0.06	0.34	0.19	0.97	0.19	5.16	3.70	8.85
20	2.94	0.21	0.30	0.08	0.07	0.34	0.19	1.03	0.20	5.35	3.94	9.29
25	3.03	0.21	0.32	0.09	0.08	0.34	0.19	1.11	0.21	5.57	4.22	9.79
30	3.14	0.21	0.34	0.09	0.09	0.34	0.19	1.19	0.23	5.82	4.54	10.36
35	3.25	0.22	0.35	0.10	0.10	0.34	0.19	1.29	0.25	6.09	4.92	11.00
40	3.38	0.22	0.37	0.10	0.12	0.34	0.19	1.41	0.27	6.39	5.36	11.75
45	3.53	0.22	0.39	0.11	0.13	0.34	0.19	1.55	0.30	6.74	5.89	12.63
50	3.69	0.23	0.41	0.12	0.14	0.34	0.19	1.71	0.33	7.15	6.53	13.67

Table VOC CARS 78
Financial Cost of Operation of Cars on Four Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.64	0.20	0.22	0.06	0.03	0.45	0.25	0.84	0.16	4.86	3.20	8.05
5	2.70	0.21	0.24	0.06	0.04	0.45	0.25	0.89	0.17	5.01	3.38	8.39
10	2.77	0.21	0.26	0.07	0.05	0.45	0.25	0.94	0.18	5.18	3.58	8.76
15	2.85	0.21	0.28	0.08	0.06	0.45	0.25	1.00	0.19	5.37	3.81	9.18
20	2.94	0.22	0.30	0.08	0.07	0.45	0.25	1.07	0.20	5.58	4.07	9.65
25	3.03	0.22	0.32	0.09	0.08	0.45	0.25	1.15	0.22	5.81	4.37	10.18
30	3.14	0.22	0.34	0.09	0.09	0.45	0.25	1.24	0.24	6.07	4.71	10.78
35	3.27	0.22	0.36	0.10	0.10	0.45	0.25	1.34	0.26	6.35	5.12	11.47
40	3.40	0.23	0.38	0.11	0.12	0.45	0.25	1.47	0.28	6.68	5.60	12.28
45	3.55	0.23	0.40	0.11	0.13	0.45	0.25	1.62	0.31	7.05	6.18	13.23
50	3.73	0.23	0.42	0.12	0.14	0.45	0.25	1.81	0.35	7.49	6.89	14.38

Table VOC CARS 79
Financial Cost of Operation of Cars on Four Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.62	0.21	0.23	0.06	0.03	0.56	0.31	0.86	0.16	5.05	3.28	8.33
5	2.69	0.21	0.25	0.07	0.04	0.56	0.31	0.91	0.17	5.22	3.47	8.69
10	2.76	0.22	0.27	0.07	0.05	0.56	0.31	0.97	0.19	5.40	3.69	9.08
15	2.84	0.22	0.29	0.08	0.06	0.56	0.31	1.03	0.20	5.59	3.93	9.52
20	2.94	0.22	0.31	0.09	0.07	0.56	0.31	1.10	0.21	5.81	4.21	10.02
25	3.04	0.23	0.32	0.09	0.08	0.56	0.31	1.19	0.23	6.05	4.53	10.58
30	3.15	0.23	0.34	0.10	0.09	0.56	0.31	1.29	0.25	6.32	4.90	11.22
35	3.28	0.23	0.36	0.10	0.10	0.56	0.31	1.40	0.27	6.63	5.34	11.96
40	3.43	0.24	0.38	0.11	0.12	0.56	0.31	1.54	0.29	6.98	5.86	12.84
45	3.59	0.24	0.40	0.12	0.13	0.56	0.31	1.71	0.33	7.38	6.50	13.88
50	3.77	0.24	0.42	0.12	0.14	0.56	0.31	1.92	0.37	7.85	7.29	15.14

Table VOC CARS 80
Financial Cost of Operation of Cars on Four Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.61	0.22	0.23	0.06	0.03	0.68	0.37	0.88	0.17	5.25	3.37	8.62
5	2.68	0.22	0.25	0.07	0.04	0.68	0.37	0.94	0.18	5.42	3.57	9.00
10	2.75	0.23	0.27	0.08	0.05	0.68	0.37	1.00	0.19	5.61	3.80	9.41
15	2.84	0.23	0.29	0.08	0.06	0.68	0.37	1.07	0.20	5.82	4.06	9.88
20	2.94	0.23	0.31	0.09	0.07	0.68	0.37	1.14	0.22	6.05	4.35	10.40
25	3.05	0.24	0.33	0.09	0.08	0.68	0.37	1.23	0.24	6.30	4.70	11.00
30	3.17	0.24	0.35	0.10	0.09	0.68	0.37	1.34	0.26	6.59	5.10	11.69
35	3.30	0.24	0.37	0.11	0.10	0.68	0.37	1.46	0.28	6.91	5.58	12.49
40	3.45	0.25	0.39	0.11	0.12	0.68	0.37	1.62	0.31	7.29	6.15	13.44
45	3.63	0.25	0.41	0.12	0.13	0.68	0.37	1.80	0.34	7.72	6.86	14.58
50	3.82	0.25	0.43	0.13	0.14	0.68	0.37	2.03	0.39	8.23	7.75	15.98

Table VOC CARS 81
Financial Cost of Operation of Cars on Four Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.59	0.23	0.24	0.07	0.03	0.79	0.43	0.91	0.17	5.46	3.46	8.92
5	2.66	0.23	0.26	0.07	0.04	0.79	0.43	0.97	0.18	5.64	3.68	9.31
10	2.75	0.23	0.28	0.08	0.05	0.79	0.43	1.03	0.20	5.83	3.92	9.75
15	2.84	0.24	0.29	0.09	0.06	0.79	0.43	1.10	0.21	6.05	4.19	10.25
20	2.94	0.24	0.31	0.09	0.07	0.79	0.43	1.18	0.23	6.29	4.51	10.80
25	3.05	0.24	0.33	0.10	0.08	0.79	0.43	1.28	0.25	6.56	4.88	11.44
30	3.18	0.25	0.35	0.10	0.09	0.79	0.43	1.40	0.27	6.87	5.32	12.18
35	3.33	0.25	0.37	0.11	0.10	0.79	0.43	1.53	0.29	7.21	5.84	13.05
40	3.49	0.26	0.39	0.12	0.12	0.79	0.43	1.70	0.33	7.61	6.47	14.08
45	3.67	0.26	0.41	0.12	0.13	0.79	0.43	1.91	0.36	8.08	7.26	15.34
50	3.88	0.27	0.43	0.13	0.14	0.79	0.43	2.17	0.42	8.65	8.26	16.91

Table VOC CARS 82
Financial Cost of Operation of Cars on Four Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	2.58	0.24	0.24	0.07	0.03	0.90	0.49	0.94	0.18	5.67	3.56	9.23
5	2.66	0.24	0.26	0.08	0.04	0.90	0.49	1.00	0.19	5.85	3.79	9.64
10	2.74	0.24	0.28	0.08	0.05	0.90	0.49	1.06	0.20	6.06	4.05	10.11
15	2.84	0.25	0.30	0.09	0.06	0.90	0.49	1.14	0.22	6.29	4.34	10.63
20	2.95	0.25	0.32	0.09	0.07	0.90	0.49	1.23	0.24	6.54	4.68	11.23
25	3.07	0.26	0.34	0.10	0.08	0.90	0.49	1.33	0.26	6.83	5.08	11.91
30	3.20	0.26	0.36	0.11	0.09	0.90	0.49	1.46	0.28	7.15	5.55	12.71
35	3.35	0.26	0.38	0.11	0.10	0.90	0.49	1.61	0.31	7.52	6.12	13.65
40	3.52	0.27	0.40	0.12	0.12	0.90	0.49	1.79	0.34	7.95	6.83	14.78
45	3.72	0.27	0.41	0.13	0.13	0.90	0.49	2.02	0.39	8.46	7.71	16.17
50	3.95	0.28	0.43	0.13	0.14	0.90	0.49	2.32	0.44	9.09	8.85	17.94

VOC Tables for Two Wheelers

(Clause 6.9)

Table VOC TW 1
Economic Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.45	0.03	0.03	0.04	0.02	0.26	0.05	0.89	0.78	1.70
5	0.46	0.03	0.03	0.04	0.02	0.28	0.05	0.92	0.82	1.77
10	0.48	0.04	0.03	0.04	0.02	0.29	0.05	0.95	0.87	1.86
15	0.49	0.04	0.03	0.04	0.02	0.31	0.05	0.99	0.92	1.95
20	0.51	0.04	0.04	0.04	0.02	0.33	0.06	1.04	0.99	2.06
25	0.54	0.04	0.04	0.04	0.02	0.35	0.06	1.09	1.06	2.19
30	0.56	0.04	0.04	0.04	0.02	0.38	0.07	1.16	1.14	2.33
35	0.60	0.04	0.04	0.04	0.02	0.41	0.07	1.23	1.23	2.50
40	0.63	0.04	0.04	0.04	0.02	0.45	0.08	1.31	1.35	2.70
45	0.68	0.04	0.05	0.04	0.02	0.50	0.09	1.42	1.48	2.94
50	0.74	0.04	0.05	0.04	0.02	0.55	0.10	1.54	1.65	3.23

Table VOC TW 2
Economic Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.46	0.04	0.03	0.06	0.03	0.27	0.05	0.94	0.82	1.76
5	0.47	0.04	0.03	0.06	0.03	0.29	0.05	0.97	0.86	1.85
10	0.49	0.04	0.03	0.06	0.03	0.31	0.05	1.01	0.92	1.94
15	0.51	0.04	0.04	0.06	0.03	0.33	0.06	1.06	0.98	2.05
20	0.53	0.04	0.04	0.06	0.03	0.35	0.06	1.11	1.05	2.17
25	0.55	0.04	0.04	0.06	0.03	0.38	0.07	1.17	1.13	2.31
30	0.59	0.04	0.04	0.06	0.03	0.41	0.07	1.24	1.22	2.48
35	0.62	0.04	0.04	0.06	0.03	0.45	0.08	1.33	1.33	2.67
40	0.67	0.05	0.05	0.06	0.03	0.49	0.09	1.43	1.47	2.91
45	0.73	0.05	0.05	0.06	0.03	0.55	0.10	1.55	1.63	3.19
50	0.80	0.05	0.05	0.06	0.03	0.61	0.11	1.70	1.83	3.55

Table VOC TW 3
Economic Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.46	0.05	0.03	0.14	0.08	0.29	0.05	1.10	0.86	1.99
5	0.48	0.05	0.03	0.14	0.08	0.31	0.05	1.14	0.91	2.08
10	0.50	0.05	0.03	0.14	0.08	0.33	0.06	1.18	0.97	2.18
15	0.52	0.05	0.04	0.14	0.08	0.35	0.06	1.24	1.04	2.31
20	0.55	0.05	0.04	0.14	0.08	0.38	0.07	1.30	1.12	2.45
25	0.58	0.05	0.04	0.14	0.08	0.41	0.07	1.37	1.21	2.61
30	0.61	0.05	0.04	0.14	0.08	0.44	0.08	1.45	1.32	2.80
35	0.66	0.05	0.05	0.14	0.08	0.49	0.09	1.55	1.45	3.03
40	0.71	0.05	0.05	0.14	0.08	0.54	0.09	1.67	1.61	3.31
45	0.78	0.06	0.05	0.14	0.08	0.61	0.11	1.82	1.81	3.66
50	0.87	0.06	0.05	0.14	0.08	0.69	0.12	2.01	2.06	4.11

Table VOC TW 4
Economic Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.47	0.06	0.03	0.23	0.12	0.30	0.05	1.27	0.91	2.22
5	0.49	0.06	0.03	0.23	0.12	0.32	0.06	1.31	0.97	2.33
10	0.51	0.06	0.04	0.23	0.12	0.35	0.06	1.37	1.03	2.45
15	0.54	0.06	0.04	0.23	0.12	0.37	0.07	1.43	1.11	2.58
20	0.57	0.06	0.04	0.23	0.12	0.40	0.07	1.50	1.20	2.74
25	0.60	0.06	0.04	0.23	0.12	0.44	0.08	1.58	1.31	2.93
30	0.65	0.07	0.05	0.23	0.12	0.48	0.08	1.68	1.44	3.16
35	0.70	0.07	0.05	0.23	0.12	0.53	0.09	1.80	1.59	3.44
40	0.77	0.07	0.05	0.23	0.12	0.60	0.10	1.94	1.79	3.78
45	0.85	0.07	0.05	0.23	0.12	0.68	0.12	2.13	2.03	4.21
50	0.96	0.07	0.05	0.23	0.12	0.79	0.14	2.37	2.36	4.78

Table VOC TW 5
Economic Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.48	0.07	0.03	0.31	0.17	0.32	0.06	1.45	0.96	2.47
5	0.50	0.07	0.04	0.31	0.17	0.34	0.06	1.50	1.03	2.59
10	0.53	0.08	0.04	0.31	0.17	0.37	0.06	1.56	1.10	2.73
15	0.56	0.08	0.04	0.31	0.17	0.40	0.07	1.63	1.19	2.89
20	0.59	0.08	0.04	0.31	0.17	0.44	0.08	1.71	1.30	3.07
25	0.64	0.08	0.05	0.31	0.17	0.48	0.08	1.81	1.42	3.30
30	0.69	0.09	0.05	0.31	0.17	0.53	0.09	1.93	1.58	3.57
35	0.75	0.09	0.05	0.31	0.17	0.59	0.10	2.07	1.77	3.90
40	0.84	0.09	0.05	0.31	0.17	0.67	0.12	2.26	2.01	4.33
45	0.94	0.10	0.05	0.31	0.17	0.78	0.14	2.50	2.32	4.88
50	1.09	0.10	0.06	0.31	0.17	0.93	0.16	2.82	2.76	5.64

Table VOC TW 6
Economic Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.49	0.10	0.04	0.40	0.22	0.34	0.06	1.65	1.02	2.75
5	0.52	0.10	0.04	0.40	0.22	0.37	0.06	1.71	1.09	2.88
10	0.55	0.11	0.04	0.40	0.22	0.40	0.07	1.78	1.18	3.04
15	0.58	0.11	0.04	0.40	0.22	0.43	0.08	1.86	1.29	3.23
20	0.63	0.12	0.05	0.40	0.22	0.47	0.08	1.96	1.41	3.45
25	0.68	0.12	0.05	0.40	0.22	0.52	0.09	2.08	1.56	3.72
30	0.74	0.13	0.05	0.40	0.22	0.58	0.10	2.22	1.74	4.05
35	0.82	0.14	0.05	0.40	0.22	0.66	0.12	2.40	1.98	4.46
40	0.93	0.14	0.05	0.40	0.22	0.77	0.13	2.64	2.29	5.01
45	1.07	0.15	0.06	0.40	0.22	0.91	0.16	2.96	2.71	5.75
50	1.27	0.16	0.06	0.40	0.22	1.11	0.19	3.42	3.32	6.82

Table VOC TW 7
Economic Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.51	0.16	0.04	0.48	0.26	0.36	0.06	1.88	1.09	3.07
5	0.54	0.17	0.04	0.48	0.26	0.39	0.07	1.96	1.17	3.23
10	0.57	0.18	0.04	0.48	0.26	0.43	0.07	2.05	1.27	3.42
15	0.61	0.20	0.04	0.48	0.26	0.47	0.08	2.15	1.40	3.65
20	0.67	0.21	0.05	0.48	0.26	0.52	0.09	2.28	1.54	3.92
25	0.73	0.23	0.05	0.48	0.26	0.58	0.10	2.43	1.72	4.26
30	0.81	0.26	0.05	0.48	0.26	0.65	0.11	2.63	1.95	4.68
35	0.91	0.28	0.05	0.48	0.26	0.75	0.13	2.88	2.25	5.23
40	1.05	0.29	0.06	0.48	0.26	0.89	0.16	3.18	2.66	5.94
45	1.24	0.29	0.06	0.48	0.26	1.09	0.19	3.61	3.24	6.95
50	1.55	0.29	0.06	0.48	0.26	1.40	0.24	4.28	4.16	8.54

Table VOC TW 8
Economic Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.53	0.29	0.04	0.57	0.31	0.39	0.07	2.19	1.16	3.47
5	0.56	0.29	0.04	0.57	0.31	0.42	0.07	2.27	1.26	3.65
10	0.60	0.29	0.04	0.57	0.31	0.46	0.08	2.36	1.38	3.86
15	0.65	0.29	0.05	0.57	0.31	0.51	0.09	2.47	1.53	4.11
20	0.71	0.29	0.05	0.57	0.31	0.57	0.10	2.60	1.70	4.42
25	0.79	0.29	0.05	0.57	0.31	0.65	0.11	2.77	1.92	4.81
30	0.89	0.29	0.05	0.57	0.31	0.74	0.13	2.98	2.21	5.31
35	1.02	0.29	0.06	0.57	0.31	0.87	0.15	3.27	2.61	6.00
40	1.21	0.29	0.06	0.57	0.31	1.06	0.19	3.68	3.17	6.97
45	1.50	0.29	0.06	0.57	0.31	1.36	0.24	4.32	4.04	8.48
50	2.00	0.29	0.06	0.57	0.31	1.87	0.33	5.43	5.58	11.13

Table VOC TW 9
Economic Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.55	0.29	0.04	0.65	0.36	0.42	0.07	2.39	1.25	3.77
5	0.59	0.29	0.04	0.65	0.36	0.46	0.08	2.47	1.37	3.98
10	0.64	0.29	0.05	0.65	0.36	0.51	0.09	2.58	1.51	4.22
15	0.70	0.29	0.05	0.65	0.36	0.56	0.10	2.71	1.68	4.53
20	0.78	0.29	0.05	0.65	0.36	0.64	0.11	2.87	1.90	4.91
25	0.87	0.29	0.05	0.65	0.36	0.73	0.13	3.08	2.18	5.40
30	1.00	0.29	0.06	0.65	0.36	0.86	0.15	3.36	2.56	6.06
35	1.18	0.29	0.06	0.65	0.36	1.04	0.18	3.76	3.10	7.00
40	1.46	0.29	0.06	0.65	0.36	1.32	0.23	4.36	3.93	8.43
45	1.93	0.29	0.06	0.65	0.36	1.80	0.32	5.40	5.37	10.91
50	2.93	0.29	0.06	0.65	0.36	2.84	0.50	7.63	8.47	16.23

Table VOC TW 10
Economic Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 11000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.58	0.29	0.04	0.74	0.40	0.45	0.08	2.59	1.36	4.10
5	0.63	0.29	0.05	0.74	0.40	0.50	0.09	2.69	1.49	4.34
10	0.69	0.29	0.05	0.74	0.40	0.56	0.10	2.82	1.66	4.63
15	0.76	0.29	0.05	0.74	0.40	0.63	0.11	2.98	1.87	5.00
20	0.86	0.29	0.05	0.74	0.40	0.72	0.13	3.18	2.15	5.48
25	0.98	0.29	0.05	0.74	0.40	0.84	0.15	3.45	2.52	6.12
30	1.15	0.29	0.06	0.74	0.40	1.02	0.18	3.84	3.04	7.02
35	1.42	0.29	0.06	0.74	0.40	1.28	0.22	4.41	3.83	8.39
40	1.86	0.29	0.06	0.74	0.40	1.74	0.30	5.39	5.17	10.71
45	2.77	0.29	0.06	0.74	0.40	2.68	0.47	7.41	7.99	15.56
50	5.85	0.29	0.07	0.74	0.40	5.87	1.03	14.25	17.52	31.92

Table VOC TW 11
Economic Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 12000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.62	0.29	0.05	0.82	0.45	0.50	0.09	2.81	1.48	4.45
5	0.68	0.29	0.05	0.82	0.45	0.55	0.10	2.93	1.64	4.74
10	0.75	0.29	0.05	0.82	0.45	0.62	0.11	3.09	1.85	5.10
15	0.84	0.29	0.05	0.82	0.45	0.71	0.12	3.28	2.12	5.57
20	0.96	0.29	0.05	0.82	0.45	0.83	0.15	3.55	2.47	6.19
25	1.13	0.29	0.06	0.82	0.45	1.00	0.17	3.91	2.97	7.06
30	1.38	0.29	0.06	0.82	0.45	1.25	0.22	4.46	3.73	8.36
35	1.79	0.29	0.06	0.82	0.45	1.67	0.29	5.38	4.99	10.54
40	2.63	0.29	0.06	0.82	0.45	2.54	0.44	7.23	7.56	14.97
45	5.23	0.29	0.07	0.82	0.45	5.23	0.92	13.00	15.59	28.76
50	6.39	0.29	0.07	0.82	0.45	6.43	1.12	15.56	19.16	34.90

Table VOC TW 12
Economic Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 13000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.66	0.29	0.05	0.91	0.50	0.54	0.10	3.04	1.62	4.85
5	0.73	0.29	0.05	0.91	0.50	0.61	0.11	3.19	1.83	5.21
10	0.82	0.29	0.05	0.91	0.50	0.70	0.12	3.39	2.08	5.66
15	0.94	0.29	0.05	0.91	0.50	0.81	0.14	3.64	2.43	6.26
20	1.10	0.29	0.06	0.91	0.50	0.98	0.17	4.00	2.91	7.09
25	1.34	0.29	0.06	0.91	0.50	1.22	0.21	4.52	3.63	8.34
30	1.73	0.29	0.06	0.91	0.50	1.62	0.28	5.38	4.82	10.39
35	2.50	0.29	0.06	0.91	0.50	2.41	0.42	7.08	7.18	14.45
40	4.72	0.29	0.07	0.91	0.50	4.71	0.82	12.02	14.05	26.26
45	6.03	0.29	0.07	0.91	0.50	6.06	1.06	14.90	18.07	33.16
50	7.01	0.29	0.07	0.91	0.50	7.07	1.24	17.07	21.08	38.34

Table VOC TW 13
Economic Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 14000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.72	0.29	0.05	0.99	0.54	0.60	0.11	3.30	1.80	5.31
5	0.81	0.29	0.05	0.99	0.54	0.69	0.12	3.49	2.05	5.75
10	0.92	0.29	0.05	0.99	0.54	0.80	0.14	3.74	2.39	6.33
15	1.07	0.29	0.06	0.99	0.54	0.96	0.17	4.08	2.85	7.14
20	1.30	0.29	0.06	0.99	0.54	1.19	0.21	4.58	3.54	8.32
25	1.67	0.29	0.06	0.99	0.54	1.56	0.27	5.40	4.67	10.26
30	2.38	0.29	0.06	0.99	0.54	2.29	0.40	6.96	6.84	14.00
35	4.31	0.29	0.07	0.99	0.54	4.29	0.75	11.24	12.79	24.23
40	6.02	0.29	0.07	0.99	0.54	6.06	1.06	15.03	18.07	33.30
45	7.00	0.29	0.07	0.99	0.54	7.07	1.24	17.20	21.08	38.48
50	10.40	0.29	0.07	0.99	0.54	10.60	1.86	24.76	31.62	56.58

Table VOC TW 14
Economic Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 15000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.79	0.29	0.05	1.08	0.59	0.68	0.12	3.59	2.03	5.84
5	0.90	0.29	0.05	1.08	0.59	0.79	0.14	3.83	2.35	6.40
10	1.05	0.29	0.06	1.08	0.59	0.94	0.16	4.16	2.80	7.18
15	1.27	0.29	0.06	1.08	0.59	1.16	0.20	4.64	3.45	8.32
20	1.62	0.29	0.06	1.08	0.59	1.51	0.27	5.41	4.52	10.15
25	2.27	0.29	0.06	1.08	0.59	2.19	0.38	6.86	6.52	13.60
30	3.96	0.29	0.06	1.08	0.59	3.93	0.69	10.60	11.73	22.56
35	6.01	0.29	0.07	1.08	0.59	6.06	1.06	15.15	18.07	33.44
40	6.99	0.29	0.07	1.08	0.59	7.07	1.24	17.32	21.08	38.62
45	10.40	0.29	0.07	1.08	0.59	10.60	1.86	24.88	31.62	56.72
50	20.59	0.29	0.07	1.08	0.59	21.21	3.71	47.54	63.24	110.99

Table VOC TW 15
Economic Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.46	0.03	0.03	0.02	0.01	0.23	0.04	0.82	0.70	1.53
5	0.47	0.03	0.03	0.02	0.01	0.25	0.04	0.84	0.73	1.59
10	0.48	0.03	0.03	0.02	0.01	0.26	0.05	0.87	0.78	1.66
15	0.49	0.03	0.03	0.02	0.01	0.28	0.05	0.90	0.82	1.73
20	0.50	0.03	0.03	0.02	0.01	0.29	0.05	0.94	0.87	1.82
25	0.52	0.03	0.04	0.02	0.01	0.31	0.05	0.98	0.93	1.92
30	0.54	0.03	0.04	0.02	0.01	0.33	0.06	1.03	1.00	2.04
35	0.56	0.03	0.04	0.02	0.01	0.36	0.06	1.09	1.07	2.17
40	0.59	0.04	0.04	0.02	0.01	0.39	0.07	1.15	1.16	2.33
45	0.63	0.04	0.05	0.02	0.01	0.42	0.07	1.23	1.27	2.51
50	0.67	0.04	0.05	0.02	0.01	0.47	0.08	1.33	1.39	2.73

Table VOC TW 16
Economic Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.46	0.03	0.03	0.06	0.03	0.24	0.04	0.89	0.72	1.63
5	0.47	0.04	0.03	0.06	0.03	0.25	0.04	0.92	0.76	1.69
10	0.48	0.04	0.03	0.06	0.03	0.27	0.05	0.95	0.80	1.77
15	0.49	0.04	0.03	0.06	0.03	0.29	0.05	0.99	0.85	1.85
20	0.51	0.04	0.04	0.06	0.03	0.30	0.05	1.03	0.91	1.94
25	0.53	0.04	0.04	0.06	0.03	0.33	0.06	1.07	0.97	2.05
30	0.55	0.04	0.04	0.06	0.03	0.35	0.06	1.13	1.04	2.18
35	0.58	0.04	0.04	0.06	0.03	0.38	0.07	1.19	1.13	2.32
40	0.61	0.04	0.04	0.06	0.03	0.41	0.07	1.26	1.22	2.50
45	0.65	0.04	0.05	0.06	0.03	0.45	0.08	1.35	1.34	2.70
50	0.70	0.04	0.05	0.06	0.03	0.50	0.09	1.46	1.48	2.95

Table VOC TW 17
Economic Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.46	0.04	0.03	0.14	0.08	0.25	0.04	1.04	0.74	1.81
5	0.47	0.04	0.03	0.14	0.08	0.26	0.05	1.07	0.79	1.88
10	0.48	0.04	0.03	0.14	0.08	0.28	0.05	1.10	0.83	1.96
15	0.50	0.04	0.03	0.14	0.08	0.30	0.05	1.14	0.88	2.05
20	0.52	0.04	0.04	0.14	0.08	0.32	0.06	1.18	0.94	2.16
25	0.54	0.04	0.04	0.14	0.08	0.34	0.06	1.24	1.01	2.28
30	0.56	0.04	0.04	0.14	0.08	0.37	0.06	1.29	1.09	2.41
35	0.59	0.04	0.04	0.14	0.08	0.40	0.07	1.36	1.18	2.58
40	0.63	0.04	0.05	0.14	0.08	0.43	0.08	1.45	1.29	2.77
45	0.67	0.04	0.05	0.14	0.08	0.48	0.08	1.55	1.42	3.00
50	0.73	0.04	0.05	0.14	0.08	0.53	0.09	1.67	1.59	3.28

Table VOC TW 18
Economic Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.47	0.04	0.03	0.23	0.12	0.26	0.05	1.19	0.77	2.01
5	0.48	0.04	0.03	0.23	0.12	0.27	0.05	1.22	0.81	2.08
10	0.49	0.04	0.03	0.23	0.12	0.29	0.05	1.26	0.86	2.17
15	0.50	0.04	0.04	0.23	0.12	0.31	0.05	1.30	0.92	2.27
20	0.52	0.05	0.04	0.23	0.12	0.33	0.06	1.35	0.98	2.38
25	0.55	0.05	0.04	0.23	0.12	0.36	0.06	1.40	1.06	2.51
30	0.58	0.05	0.04	0.23	0.12	0.38	0.07	1.47	1.15	2.66
35	0.61	0.05	0.05	0.23	0.12	0.42	0.07	1.55	1.25	2.84
40	0.65	0.05	0.05	0.23	0.12	0.46	0.08	1.64	1.37	3.06
45	0.70	0.05	0.05	0.23	0.12	0.51	0.09	1.75	1.52	3.32
50	0.77	0.05	0.05	0.23	0.12	0.57	0.10	1.89	1.70	3.64

Table VOC TW 19
Economic Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.47	0.05	0.03	0.31	0.17	0.27	0.05	1.34	0.80	2.20
5	0.48	0.05	0.03	0.31	0.17	0.28	0.05	1.38	0.84	2.28
10	0.50	0.05	0.04	0.31	0.17	0.30	0.05	1.42	0.90	2.38
15	0.51	0.05	0.04	0.31	0.17	0.32	0.06	1.46	0.96	2.48
20	0.54	0.05	0.04	0.31	0.17	0.35	0.06	1.51	1.03	2.61
25	0.56	0.05	0.04	0.31	0.17	0.37	0.07	1.58	1.11	2.75
30	0.59	0.05	0.04	0.31	0.17	0.40	0.07	1.65	1.21	2.92
35	0.63	0.05	0.05	0.31	0.17	0.44	0.08	1.74	1.32	3.12
40	0.68	0.06	0.05	0.31	0.17	0.49	0.09	1.84	1.46	3.36
45	0.74	0.06	0.05	0.31	0.17	0.55	0.10	1.97	1.63	3.66
50	0.81	0.06	0.05	0.31	0.17	0.62	0.11	2.13	1.84	4.03

Table VOC TW 20
Economic Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.47	0.05	0.03	0.40	0.22	0.28	0.05	1.50	0.82	2.40
5	0.49	0.06	0.03	0.40	0.22	0.29	0.05	1.54	0.88	2.49
10	0.50	0.06	0.04	0.40	0.22	0.31	0.05	1.58	0.93	2.59
15	0.52	0.06	0.04	0.40	0.22	0.34	0.06	1.63	1.00	2.71
20	0.55	0.06	0.04	0.40	0.22	0.36	0.06	1.69	1.08	2.85
25	0.58	0.06	0.04	0.40	0.22	0.39	0.07	1.76	1.17	3.00
30	0.61	0.06	0.05	0.40	0.22	0.43	0.07	1.84	1.27	3.19
35	0.66	0.06	0.05	0.40	0.22	0.47	0.08	1.93	1.40	3.42
40	0.71	0.07	0.05	0.40	0.22	0.52	0.09	2.05	1.56	3.69
45	0.78	0.07	0.05	0.40	0.22	0.59	0.10	2.20	1.75	4.03
50	0.86	0.07	0.05	0.40	0.22	0.67	0.12	2.39	2.00	4.47

Table VOC TW 21
Economic Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.48	0.06	0.03	0.48	0.26	0.29	0.05	1.66	0.85	2.61
5	0.49	0.06	0.04	0.48	0.26	0.31	0.05	1.70	0.91	2.71
10	0.51	0.07	0.04	0.48	0.26	0.33	0.06	1.75	0.97	2.82
15	0.53	0.07	0.04	0.48	0.26	0.35	0.06	1.80	1.05	2.95
20	0.56	0.07	0.04	0.48	0.26	0.38	0.07	1.87	1.13	3.10
25	0.60	0.07	0.04	0.48	0.26	0.41	0.07	1.94	1.23	3.27
30	0.64	0.07	0.05	0.48	0.26	0.45	0.08	2.03	1.35	3.48
35	0.68	0.08	0.05	0.48	0.26	0.50	0.09	2.14	1.49	3.73
40	0.74	0.08	0.05	0.48	0.26	0.56	0.10	2.28	1.67	4.05
45	0.82	0.08	0.05	0.48	0.26	0.64	0.11	2.45	1.90	4.44
50	0.92	0.08	0.06	0.48	0.26	0.74	0.13	2.67	2.19	4.96

Table VOC TW 22
Economic Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.48	0.08	0.03	0.57	0.31	0.30	0.05	1.82	0.89	2.83
5	0.50	0.08	0.04	0.57	0.31	0.32	0.06	1.87	0.95	2.93
10	0.52	0.08	0.04	0.57	0.31	0.34	0.06	1.92	1.02	3.05
15	0.55	0.08	0.04	0.57	0.31	0.37	0.06	1.98	1.10	3.19
20	0.58	0.09	0.04	0.57	0.31	0.40	0.07	2.05	1.19	3.36
25	0.62	0.09	0.05	0.57	0.31	0.44	0.08	2.14	1.30	3.56
30	0.66	0.09	0.05	0.57	0.31	0.48	0.08	2.24	1.43	3.79
35	0.72	0.09	0.05	0.57	0.31	0.54	0.09	2.37	1.60	4.08
40	0.79	0.10	0.05	0.57	0.31	0.60	0.11	2.52	1.80	4.44
45	0.88	0.10	0.05	0.57	0.31	0.69	0.12	2.73	2.07	4.91
50	1.00	0.11	0.06	0.57	0.31	0.81	0.14	2.99	2.42	5.53

Table VOC TW 23
Economic Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.49	0.09	0.04	0.65	0.36	0.31	0.05	1.99	0.92	3.05
5	0.51	0.10	0.04	0.65	0.36	0.33	0.06	2.04	0.99	3.17
10	0.53	0.10	0.04	0.65	0.36	0.36	0.06	2.10	1.06	3.30
15	0.56	0.10	0.04	0.65	0.36	0.39	0.07	2.17	1.15	3.46
20	0.60	0.11	0.04	0.65	0.36	0.42	0.07	2.25	1.25	3.64
25	0.64	0.11	0.05	0.65	0.36	0.46	0.08	2.35	1.38	3.86
30	0.69	0.12	0.05	0.65	0.36	0.51	0.09	2.47	1.53	4.13
35	0.75	0.13	0.05	0.65	0.36	0.58	0.10	2.62	1.71	4.46
40	0.84	0.13	0.05	0.65	0.36	0.66	0.11	2.80	1.95	4.89
45	0.94	0.14	0.06	0.65	0.36	0.76	0.13	3.04	2.27	5.45
50	1.09	0.15	0.06	0.65	0.36	0.91	0.16	3.37	2.71	6.22

Table VOC TW 24
Economic Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.46	0.03	0.02	0.02	0.01	0.23	0.04	0.82	0.98	1.81
5	0.47	0.03	0.03	0.02	0.01	0.24	0.04	0.84	1.03	1.88
10	0.48	0.03	0.03	0.02	0.01	0.26	0.04	0.87	1.09	1.96
15	0.49	0.03	0.03	0.02	0.01	0.27	0.05	0.90	1.15	2.05
20	0.50	0.03	0.03	0.02	0.01	0.29	0.05	0.93	1.22	2.16
25	0.51	0.03	0.04	0.02	0.01	0.30	0.05	0.97	1.30	2.28
30	0.53	0.03	0.04	0.02	0.01	0.33	0.06	1.02	1.39	2.41
35	0.56	0.03	0.04	0.02	0.01	0.35	0.06	1.07	1.49	2.57
40	0.58	0.03	0.04	0.02	0.01	0.38	0.07	1.13	1.61	2.75
45	0.62	0.03	0.05	0.02	0.01	0.41	0.07	1.21	1.75	2.96
50	0.65	0.04	0.05	0.02	0.01	0.45	0.08	1.29	1.91	3.21

Table VOC TW 25
Economic Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.46	0.03	0.03	0.06	0.03	0.24	0.04	0.89	1.01	1.91
5	0.47	0.03	0.03	0.06	0.03	0.25	0.04	0.91	1.06	1.98
10	0.48	0.03	0.03	0.06	0.03	0.26	0.05	0.94	1.12	2.07
15	0.49	0.03	0.03	0.06	0.03	0.28	0.05	0.97	1.18	2.17
20	0.50	0.03	0.03	0.06	0.03	0.30	0.05	1.01	1.26	2.28
25	0.52	0.04	0.04	0.06	0.03	0.31	0.06	1.05	1.34	2.40
30	0.54	0.04	0.04	0.06	0.03	0.34	0.06	1.10	1.43	2.55
35	0.57	0.04	0.04	0.06	0.03	0.36	0.06	1.16	1.54	2.71
40	0.60	0.04	0.04	0.06	0.03	0.39	0.07	1.23	1.67	2.91
45	0.63	0.04	0.05	0.06	0.03	0.43	0.07	1.31	1.82	3.14
50	0.67	0.04	0.05	0.06	0.03	0.47	0.08	1.40	2.00	3.41

Table VOC TW 26
Economic Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.46	0.04	0.03	0.14	0.08	0.24	0.04	1.03	1.03	2.09
5	0.47	0.04	0.03	0.14	0.08	0.26	0.04	1.06	1.09	2.17
10	0.48	0.04	0.03	0.14	0.08	0.27	0.05	1.09	1.15	2.26
15	0.50	0.04	0.03	0.14	0.08	0.29	0.05	1.12	1.22	2.37
20	0.51	0.04	0.04	0.14	0.08	0.30	0.05	1.16	1.29	2.48
25	0.53	0.04	0.04	0.14	0.08	0.32	0.06	1.21	1.38	2.62
30	0.55	0.04	0.04	0.14	0.08	0.35	0.06	1.26	1.48	2.77
35	0.58	0.04	0.04	0.14	0.08	0.38	0.07	1.32	1.60	2.95
40	0.61	0.04	0.04	0.14	0.08	0.41	0.07	1.40	1.74	3.16
45	0.65	0.04	0.05	0.14	0.08	0.45	0.08	1.48	1.90	3.41
50	0.70	0.04	0.05	0.14	0.08	0.49	0.09	1.59	2.10	3.72

Table VOC TW 27
Economic Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.47	0.04	0.03	0.23	0.12	0.25	0.04	1.18	1.06	2.28
5	0.48	0.04	0.03	0.23	0.12	0.26	0.05	1.20	1.11	2.36
10	0.49	0.04	0.03	0.23	0.12	0.28	0.05	1.24	1.18	2.46
15	0.50	0.04	0.03	0.23	0.12	0.29	0.05	1.27	1.25	2.57
20	0.52	0.04	0.04	0.23	0.12	0.31	0.05	1.31	1.33	2.70
25	0.54	0.04	0.04	0.23	0.12	0.34	0.06	1.36	1.43	2.84
30	0.56	0.04	0.04	0.23	0.12	0.36	0.06	1.42	1.54	3.01
35	0.59	0.04	0.04	0.23	0.12	0.39	0.07	1.49	1.66	3.20
40	0.63	0.04	0.05	0.23	0.12	0.43	0.07	1.57	1.81	3.43
45	0.67	0.04	0.05	0.23	0.12	0.47	0.08	1.66	1.99	3.70
50	0.72	0.04	0.05	0.23	0.12	0.52	0.09	1.78	2.21	4.04

Table VOC TW 28
Economic Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.47	0.04	0.03	0.31	0.17	0.25	0.04	1.32	1.08	2.47
5	0.48	0.04	0.03	0.31	0.17	0.27	0.05	1.35	1.14	2.56
10	0.49	0.04	0.03	0.31	0.17	0.29	0.05	1.39	1.21	2.66
15	0.51	0.04	0.04	0.31	0.17	0.30	0.05	1.43	1.29	2.78
20	0.53	0.04	0.04	0.31	0.17	0.32	0.06	1.47	1.38	2.91
25	0.55	0.04	0.04	0.31	0.17	0.35	0.06	1.52	1.48	3.07
30	0.57	0.05	0.04	0.31	0.17	0.38	0.07	1.59	1.60	3.25
35	0.61	0.05	0.04	0.31	0.17	0.41	0.07	1.66	1.73	3.46
40	0.64	0.05	0.05	0.31	0.17	0.45	0.08	1.75	1.90	3.71
45	0.69	0.05	0.05	0.31	0.17	0.49	0.09	1.85	2.09	4.01
50	0.75	0.05	0.05	0.31	0.17	0.55	0.10	1.98	2.33	4.38

Table VOC TW 29
Economic Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.47	0.04	0.03	0.40	0.22	0.26	0.05	1.47	1.11	2.66
5	0.48	0.05	0.03	0.40	0.22	0.28	0.05	1.50	1.18	2.76
10	0.50	0.05	0.03	0.40	0.22	0.29	0.05	1.54	1.25	2.87
15	0.51	0.05	0.04	0.40	0.22	0.31	0.05	1.58	1.33	2.99
20	0.53	0.05	0.04	0.40	0.22	0.34	0.06	1.63	1.42	3.14
25	0.56	0.05	0.04	0.40	0.22	0.36	0.06	1.69	1.53	3.30
30	0.59	0.05	0.04	0.40	0.22	0.39	0.07	1.75	1.66	3.49
35	0.62	0.05	0.05	0.40	0.22	0.42	0.07	1.83	1.81	3.72
40	0.66	0.05	0.05	0.40	0.22	0.47	0.08	1.93	1.98	3.99
45	0.72	0.05	0.05	0.40	0.22	0.52	0.09	2.04	2.20	4.33
50	0.78	0.05	0.05	0.40	0.22	0.58	0.10	2.18	2.47	4.74

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Table VOC TW 30
Economic Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.48	0.05	0.03	0.48	0.26	0.27	0.05	1.62	1.14	2.86
5	0.49	0.05	0.03	0.48	0.26	0.28	0.05	1.65	1.21	2.96
10	0.50	0.05	0.04	0.48	0.26	0.30	0.05	1.69	1.29	3.08
15	0.52	0.05	0.04	0.48	0.26	0.32	0.06	1.74	1.37	3.21
20	0.54	0.05	0.04	0.48	0.26	0.35	0.06	1.79	1.47	3.36
25	0.57	0.05	0.04	0.48	0.26	0.37	0.07	1.85	1.59	3.54
30	0.60	0.06	0.04	0.48	0.26	0.41	0.07	1.92	1.73	3.75
35	0.64	0.06	0.05	0.48	0.26	0.44	0.08	2.01	1.89	4.00
40	0.69	0.06	0.05	0.48	0.26	0.49	0.09	2.12	2.08	4.30
45	0.74	0.06	0.05	0.48	0.26	0.55	0.10	2.24	2.32	4.66
50	0.82	0.06	0.05	0.48	0.26	0.62	0.11	2.40	2.62	5.13

Table VOC TW 31
Economic Cost of Operation of Two Wheelers on Two Lane Roads (Rs./km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.48	0.05	0.03	0.57	0.31	0.28	0.05	1.77	1.17	3.06
5	0.49	0.06	0.03	0.57	0.31	0.29	0.05	1.81	1.25	3.17
10	0.51	0.06	0.04	0.57	0.31	0.31	0.05	1.85	1.33	3.29
15	0.53	0.06	0.04	0.57	0.31	0.33	0.06	1.90	1.42	3.43
20	0.55	0.06	0.04	0.57	0.31	0.36	0.06	1.95	1.53	3.60
25	0.58	0.06	0.04	0.57	0.31	0.39	0.07	2.02	1.65	3.79
30	0.62	0.06	0.05	0.57	0.31	0.42	0.07	2.10	1.80	4.02
35	0.66	0.06	0.05	0.57	0.31	0.46	0.08	2.20	1.98	4.29
40	0.71	0.07	0.05	0.57	0.31	0.52	0.09	2.31	2.19	4.62
45	0.77	0.07	0.05	0.57	0.31	0.58	0.10	2.45	2.46	5.03
50	0.86	0.07	0.05	0.57	0.31	0.66	0.12	2.63	2.80	5.55

Table VOC TW 32
Economic Cost of Operation of Two Wheelers on Two Lane Roads (Rs./km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.48	0.06	0.03	0.65	0.36	0.28	0.05	1.92	1.21	3.26
5	0.50	0.06	0.04	0.65	0.36	0.30	0.05	1.96	1.28	3.38
10	0.52	0.06	0.04	0.65	0.36	0.32	0.06	2.01	1.37	3.51
15	0.54	0.07	0.04	0.65	0.36	0.35	0.06	2.06	1.47	3.67
20	0.57	0.07	0.04	0.65	0.36	0.37	0.07	2.12	1.59	3.84
25	0.60	0.07	0.04	0.65	0.36	0.40	0.07	2.20	1.72	4.05
30	0.63	0.07	0.05	0.65	0.36	0.44	0.08	2.28	1.88	4.30
35	0.68	0.07	0.05	0.65	0.36	0.49	0.09	2.39	2.07	4.59
40	0.74	0.08	0.05	0.65	0.36	0.54	0.10	2.51	2.31	4.96
45	0.81	0.08	0.05	0.65	0.36	0.61	0.11	2.67	2.61	5.42
50	0.90	0.08	0.06	0.65	0.36	0.70	0.12	2.88	3.00	6.01

Table VOC TW 33
Economic Cost of Operation of Two Wheelers on Four Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.47	0.03	0.02	0.02	0.01	0.22	0.04	0.81	0.93	1.74
5	0.47	0.03	0.03	0.02	0.01	0.23	0.04	0.83	0.97	1.81
10	0.48	0.03	0.03	0.02	0.01	0.24	0.04	0.85	1.03	1.88
15	0.49	0.03	0.03	0.02	0.01	0.26	0.04	0.88	1.09	1.97
20	0.50	0.03	0.03	0.02	0.01	0.27	0.05	0.91	1.15	2.07
25	0.51	0.03	0.04	0.02	0.01	0.29	0.05	0.94	1.22	2.18
30	0.53	0.03	0.04	0.02	0.01	0.31	0.05	0.98	1.31	2.30
35	0.55	0.03	0.04	0.02	0.01	0.33	0.06	1.03	1.41	2.45
40	0.57	0.03	0.04	0.02	0.01	0.36	0.06	1.09	1.52	2.62
45	0.60	0.03	0.04	0.02	0.01	0.39	0.07	1.16	1.65	2.82
50	0.64	0.03	0.05	0.02	0.01	0.42	0.07	1.24	1.80	3.05

Table VOC TW 34
Economic Cost of Operation of Two Wheelers on Four Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.47	0.03	0.02	0.06	0.03	0.22	0.04	0.88	0.95	1.84
5	0.47	0.03	0.03	0.06	0.03	0.23	0.04	0.90	1.00	1.91
10	0.48	0.03	0.03	0.06	0.03	0.25	0.04	0.92	1.05	1.99
15	0.49	0.03	0.03	0.06	0.03	0.26	0.05	0.95	1.12	2.08
20	0.50	0.03	0.03	0.06	0.03	0.28	0.05	0.98	1.18	2.18
25	0.52	0.03	0.04	0.06	0.03	0.30	0.05	1.02	1.26	2.30
30	0.53	0.03	0.04	0.06	0.03	0.32	0.06	1.07	1.35	2.43
35	0.56	0.03	0.04	0.06	0.03	0.34	0.06	1.12	1.46	2.59
40	0.58	0.03	0.04	0.06	0.03	0.37	0.06	1.18	1.58	2.77
45	0.61	0.03	0.04	0.06	0.03	0.40	0.07	1.26	1.72	2.99
50	0.65	0.03	0.05	0.06	0.03	0.44	0.08	1.34	1.89	3.25

Table VOC TW 35
Economic Cost of Operation of Two Wheelers on Four Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.47	0.03	0.02	0.14	0.08	0.23	0.04	1.01	0.97	2.02
5	0.48	0.03	0.03	0.14	0.08	0.24	0.04	1.04	1.02	2.09
10	0.48	0.03	0.03	0.14	0.08	0.25	0.04	1.06	1.08	2.18
15	0.49	0.03	0.03	0.14	0.08	0.27	0.05	1.09	1.15	2.27
20	0.51	0.03	0.03	0.14	0.08	0.29	0.05	1.13	1.22	2.38
25	0.52	0.03	0.04	0.14	0.08	0.31	0.05	1.17	1.30	2.51
30	0.54	0.03	0.04	0.14	0.08	0.33	0.06	1.22	1.40	2.65
35	0.57	0.03	0.04	0.14	0.08	0.36	0.06	1.28	1.51	2.82
40	0.60	0.03	0.04	0.14	0.08	0.39	0.07	1.35	1.64	3.02
45	0.63	0.03	0.05	0.14	0.08	0.42	0.07	1.43	1.80	3.25
50	0.67	0.04	0.05	0.14	0.08	0.47	0.08	1.52	1.98	3.54

Table VOC TW 36
Economic Cost of Operation of Two Wheelers on Four Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.47	0.03	0.03	0.23	0.12	0.23	0.04	1.16	1.00	2.20
5	0.48	0.03	0.03	0.23	0.12	0.25	0.04	1.18	1.05	2.28
10	0.49	0.03	0.03	0.23	0.12	0.26	0.05	1.21	1.11	2.37
15	0.50	0.03	0.03	0.23	0.12	0.28	0.05	1.24	1.18	2.47
20	0.51	0.03	0.03	0.23	0.12	0.30	0.05	1.28	1.26	2.59
25	0.53	0.03	0.04	0.23	0.12	0.32	0.06	1.32	1.35	2.72
30	0.55	0.03	0.04	0.23	0.12	0.34	0.06	1.38	1.45	2.88
35	0.58	0.03	0.04	0.23	0.12	0.37	0.06	1.44	1.57	3.06
40	0.61	0.04	0.04	0.23	0.12	0.40	0.07	1.51	1.71	3.27
45	0.65	0.04	0.05	0.23	0.12	0.44	0.08	1.60	1.88	3.53
50	0.70	0.04	0.05	0.23	0.12	0.49	0.09	1.71	2.09	3.84

Table VOC TW 37
Economic Cost of Operation of Two Wheelers on Four Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.47	0.03	0.03	0.31	0.17	0.24	0.04	1.30	1.02	2.38
5	0.48	0.03	0.03	0.31	0.17	0.25	0.04	1.32	1.08	2.47
10	0.49	0.03	0.03	0.31	0.17	0.27	0.05	1.35	1.14	2.56
15	0.50	0.03	0.03	0.31	0.17	0.29	0.05	1.39	1.22	2.67
20	0.52	0.03	0.03	0.31	0.17	0.31	0.05	1.43	1.30	2.80
25	0.54	0.04	0.04	0.31	0.17	0.33	0.06	1.48	1.40	2.94
30	0.56	0.04	0.04	0.31	0.17	0.35	0.06	1.54	1.51	3.11
35	0.59	0.04	0.04	0.31	0.17	0.38	0.07	1.60	1.64	3.30
40	0.63	0.04	0.04	0.31	0.17	0.42	0.07	1.68	1.79	3.54
45	0.67	0.04	0.05	0.31	0.17	0.46	0.08	1.78	1.97	3.82
50	0.72	0.04	0.05	0.31	0.17	0.52	0.09	1.90	2.20	4.17

Table VOC TW 38
Economic Cost of Operation of Two Wheelers on Four Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.47	0.03	0.03	0.40	0.22	0.25	0.04	1.44	1.05	2.57
5	0.48	0.03	0.03	0.40	0.22	0.26	0.05	1.47	1.11	2.66
10	0.49	0.03	0.03	0.40	0.22	0.28	0.05	1.50	1.18	2.76
15	0.51	0.04	0.03	0.40	0.22	0.30	0.05	1.54	1.26	2.88
20	0.53	0.04	0.04	0.40	0.22	0.32	0.06	1.58	1.34	3.01
25	0.55	0.04	0.04	0.40	0.22	0.34	0.06	1.64	1.45	3.16
30	0.57	0.04	0.04	0.40	0.22	0.37	0.06	1.70	1.57	3.34
35	0.61	0.04	0.04	0.40	0.22	0.40	0.07	1.77	1.71	3.56
40	0.64	0.04	0.04	0.40	0.22	0.44	0.08	1.86	1.87	3.81
45	0.69	0.04	0.05	0.40	0.22	0.49	0.09	1.97	2.08	4.12
50	0.75	0.04	0.05	0.40	0.22	0.55	0.10	2.10	2.33	4.51

Table VOC TW 39
Economic Cost of Operation of Two Wheelers on Four Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.48	0.04	0.03	0.48	0.26	0.25	0.04	1.58	1.08	2.76
5	0.49	0.04	0.03	0.48	0.26	0.27	0.05	1.61	1.14	2.85
10	0.50	0.04	0.03	0.48	0.26	0.29	0.05	1.65	1.21	2.96
15	0.51	0.04	0.03	0.48	0.26	0.30	0.05	1.69	1.30	3.09
20	0.53	0.04	0.04	0.48	0.26	0.33	0.06	1.74	1.39	3.23
25	0.56	0.04	0.04	0.48	0.26	0.35	0.06	1.79	1.50	3.39
30	0.59	0.04	0.04	0.48	0.26	0.38	0.07	1.86	1.63	3.59
35	0.62	0.04	0.04	0.48	0.26	0.42	0.07	1.94	1.78	3.82
40	0.66	0.04	0.04	0.48	0.26	0.46	0.08	2.04	1.96	4.10
45	0.72	0.04	0.05	0.48	0.26	0.51	0.09	2.16	2.19	4.45
50	0.79	0.04	0.05	0.48	0.26	0.58	0.10	2.31	2.47	4.88

Table VOC TW 40
Economic Cost of Operation of Two Wheelers on Four Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.48	0.04	0.03	0.57	0.31	0.26	0.05	1.73	1.11	2.95
5	0.49	0.04	0.03	0.57	0.31	0.28	0.05	1.76	1.18	3.05
10	0.50	0.04	0.03	0.57	0.31	0.29	0.05	1.80	1.25	3.17
15	0.52	0.04	0.03	0.57	0.31	0.32	0.06	1.84	1.34	3.30
20	0.54	0.04	0.04	0.57	0.31	0.34	0.06	1.89	1.44	3.45
25	0.57	0.04	0.04	0.57	0.31	0.37	0.06	1.96	1.56	3.63
30	0.60	0.04	0.04	0.57	0.31	0.40	0.07	2.03	1.70	3.84
35	0.64	0.04	0.04	0.57	0.31	0.44	0.08	2.12	1.86	4.10
40	0.69	0.04	0.05	0.57	0.31	0.49	0.09	2.22	2.07	4.41
45	0.75	0.04	0.05	0.57	0.31	0.54	0.10	2.35	2.32	4.79
50	0.82	0.04	0.05	0.57	0.31	0.62	0.11	2.52	2.64	5.28

Table VOC TW 41
Economic Cost of Operation of Two Wheelers on Four Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	0.48	0.04	0.03	0.65	0.36	0.27	0.05	1.87	1.14	3.15
5	0.50	0.04	0.03	0.65	0.36	0.28	0.05	1.91	1.21	3.25
10	0.51	0.04	0.03	0.65	0.36	0.30	0.05	1.95	1.29	3.38
15	0.53	0.04	0.03	0.65	0.36	0.33	0.06	2.00	1.39	3.52
20	0.55	0.04	0.04	0.65	0.36	0.35	0.06	2.05	1.50	3.68
25	0.58	0.04	0.04	0.65	0.36	0.38	0.07	2.12	1.62	3.88
30	0.62	0.04	0.04	0.65	0.36	0.42	0.07	2.20	1.77	4.11
35	0.66	0.04	0.04	0.65	0.36	0.46	0.08	2.29	1.96	4.38
40	0.71	0.04	0.05	0.65	0.36	0.51	0.09	2.41	2.18	4.73
45	0.78	0.04	0.05	0.65	0.36	0.58	0.10	2.56	2.46	5.15
50	0.87	0.04	0.05	0.65	0.36	0.66	0.12	2.75	2.82	5.71

Table VOC TW 42
Financial Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.12	0.04	0.05	0.11	0.06	0.27	0.06	1.72	0.78	2.49
5	1.15	0.04	0.06	0.11	0.06	0.28	0.07	1.77	0.82	2.59
10	1.18	0.04	0.06	0.11	0.06	0.30	0.07	1.82	0.87	2.69
15	1.22	0.04	0.07	0.11	0.06	0.32	0.07	1.89	0.92	2.82
20	1.27	0.04	0.07	0.11	0.06	0.34	0.08	1.97	0.99	2.96
25	1.33	0.05	0.08	0.11	0.06	0.36	0.09	2.06	1.06	3.12
30	1.39	0.05	0.08	0.11	0.06	0.39	0.09	2.17	1.14	3.31
35	1.47	0.05	0.09	0.11	0.06	0.42	0.10	2.30	1.23	3.53
40	1.57	0.05	0.09	0.11	0.06	0.46	0.11	2.45	1.35	3.79
45	1.68	0.05	0.10	0.11	0.06	0.51	0.12	2.62	1.48	4.11
50	1.83	0.05	0.10	0.11	0.06	0.57	0.13	2.84	1.65	4.49

Table VOC TW 43
Financial Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.13	0.05	0.06	0.08	0.04	0.28	0.07	1.71	0.82	2.52
5	1.16	0.05	0.06	0.08	0.04	0.30	0.07	1.76	0.86	2.63
10	1.20	0.05	0.07	0.08	0.04	0.31	0.07	1.83	0.92	2.75
15	1.25	0.05	0.07	0.08	0.04	0.34	0.08	1.91	0.98	2.89
20	1.31	0.05	0.08	0.08	0.04	0.36	0.08	2.00	1.05	3.05
25	1.37	0.05	0.08	0.08	0.04	0.39	0.09	2.11	1.13	3.23
30	1.45	0.05	0.09	0.08	0.04	0.42	0.10	2.23	1.22	3.45
35	1.54	0.05	0.09	0.08	0.04	0.46	0.11	2.38	1.33	3.71
40	1.66	0.06	0.10	0.08	0.04	0.50	0.12	2.55	1.47	4.02
45	1.80	0.06	0.10	0.08	0.04	0.56	0.13	2.76	1.63	4.39
50	1.97	0.06	0.10	0.08	0.04	0.63	0.15	3.03	1.83	4.86

Table VOC TW 44
Financial Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.15	0.06	0.06	0.20	0.11	0.29	0.07	1.93	0.86	2.79
5	1.18	0.06	0.07	0.20	0.11	0.31	0.07	2.00	0.91	2.91
10	1.23	0.06	0.07	0.20	0.11	0.33	0.08	2.07	0.97	3.05
15	1.28	0.06	0.08	0.20	0.11	0.36	0.08	2.16	1.04	3.20
20	1.35	0.06	0.08	0.20	0.11	0.38	0.09	2.27	1.12	3.39
25	1.43	0.06	0.09	0.20	0.11	0.42	0.10	2.39	1.21	3.60
30	1.52	0.06	0.09	0.20	0.11	0.45	0.11	2.53	1.32	3.86
35	1.63	0.07	0.09	0.20	0.11	0.50	0.12	2.71	1.45	4.16
40	1.76	0.07	0.10	0.20	0.11	0.55	0.13	2.92	1.61	4.53
45	1.93	0.07	0.10	0.20	0.11	0.62	0.15	3.18	1.81	4.99
50	2.15	0.07	0.11	0.20	0.11	0.71	0.17	3.50	2.06	5.57

Table VOC TW 45
Financial Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.16	0.07	0.07	0.31	0.17	0.31	0.07	2.17	0.91	3.07
5	1.21	0.07	0.07	0.31	0.17	0.33	0.08	2.24	0.97	3.21
10	1.26	0.07	0.08	0.31	0.17	0.35	0.08	2.33	1.03	3.37
15	1.33	0.07	0.08	0.31	0.17	0.38	0.09	2.44	1.11	3.55
20	1.40	0.08	0.08	0.31	0.17	0.41	0.10	2.56	1.20	3.76
25	1.49	0.08	0.09	0.31	0.17	0.45	0.11	2.70	1.31	4.01
30	1.60	0.08	0.09	0.31	0.17	0.49	0.12	2.87	1.44	4.31
35	1.73	0.08	0.10	0.31	0.17	0.55	0.13	3.07	1.59	4.67
40	1.90	0.09	0.10	0.31	0.17	0.61	0.14	3.33	1.79	5.11
45	2.11	0.09	0.11	0.31	0.17	0.70	0.16	3.65	2.03	5.68
50	2.38	0.09	0.11	0.31	0.17	0.81	0.19	4.07	2.36	6.43

Table VOC TW 46
Financial Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.19	0.09	0.07	0.43	0.24	0.33	0.08	2.42	0.96	3.38
5	1.24	0.09	0.07	0.43	0.24	0.35	0.08	2.51	1.03	3.53
10	1.30	0.09	0.08	0.43	0.24	0.38	0.09	2.61	1.10	3.71
15	1.38	0.10	0.08	0.43	0.24	0.41	0.10	2.73	1.19	3.92
20	1.47	0.10	0.09	0.43	0.24	0.44	0.10	2.87	1.30	4.17
25	1.57	0.10	0.09	0.43	0.24	0.49	0.11	3.04	1.42	4.46
30	1.70	0.11	0.10	0.43	0.24	0.54	0.13	3.24	1.58	4.82
35	1.87	0.11	0.10	0.43	0.24	0.61	0.14	3.49	1.77	5.26
40	2.07	0.12	0.11	0.43	0.24	0.69	0.16	3.81	2.01	5.81
45	2.34	0.12	0.11	0.43	0.24	0.80	0.19	4.22	2.32	6.54
50	2.70	0.12	0.12	0.43	0.24	0.95	0.22	4.77	2.76	7.53

Table VOC TW 47
Financial Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.22	0.12	0.07	0.55	0.30	0.35	0.08	2.69	1.02	3.71
5	1.28	0.13	0.08	0.55	0.30	0.38	0.09	2.80	1.09	3.89
10	1.36	0.13	0.08	0.55	0.30	0.41	0.10	2.92	1.18	4.10
15	1.44	0.14	0.09	0.55	0.30	0.44	0.10	3.06	1.29	4.34
20	1.55	0.15	0.09	0.55	0.30	0.48	0.11	3.23	1.41	4.64
25	1.67	0.15	0.10	0.55	0.30	0.53	0.13	3.43	1.56	4.99
30	1.83	0.16	0.10	0.55	0.30	0.60	0.14	3.68	1.74	5.42
35	2.03	0.17	0.11	0.55	0.30	0.68	0.16	3.99	1.98	5.97
40	2.29	0.18	0.11	0.55	0.30	0.78	0.18	4.39	2.29	6.68
45	2.64	0.19	0.12	0.55	0.30	0.93	0.22	4.94	2.71	7.65
50	3.15	0.20	0.12	0.55	0.30	1.14	0.27	5.72	3.32	9.04

Table VOC TW 48
Financial Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.26	0.20	0.08	0.66	0.36	0.37	0.09	3.02	1.09	4.11
5	1.33	0.21	0.08	0.66	0.36	0.40	0.09	3.15	1.17	4.32
10	1.42	0.22	0.09	0.66	0.36	0.44	0.10	3.30	1.27	4.57
15	1.52	0.24	0.09	0.66	0.36	0.48	0.11	3.47	1.40	4.87
20	1.65	0.26	0.10	0.66	0.36	0.53	0.12	3.68	1.54	5.22
25	1.80	0.29	0.10	0.66	0.36	0.59	0.14	3.94	1.72	5.66
30	1.99	0.32	0.11	0.66	0.36	0.67	0.16	4.27	1.95	6.22
35	2.24	0.35	0.11	0.66	0.36	0.77	0.18	4.68	2.25	6.93
40	2.58	0.35	0.11	0.66	0.36	0.91	0.21	5.20	2.66	7.86
45	3.07	0.35	0.12	0.66	0.36	1.11	0.26	5.94	3.24	9.19
50	3.82	0.35	0.12	0.66	0.36	1.43	0.34	7.09	4.16	11.25

Table VOC TW 49
Financial Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.31	0.35	0.08	0.78	0.43	0.40	0.09	3.44	1.16	4.61
5	1.39	0.35	0.09	0.78	0.43	0.43	0.10	3.58	1.26	4.84
10	1.49	0.35	0.09	0.78	0.43	0.47	0.11	3.73	1.38	5.11
15	1.62	0.35	0.10	0.78	0.43	0.52	0.12	3.92	1.53	5.44
20	1.77	0.35	0.10	0.78	0.43	0.58	0.14	4.15	1.70	5.85
25	1.96	0.35	0.10	0.78	0.43	0.66	0.16	4.44	1.92	6.36
30	2.20	0.35	0.11	0.78	0.43	0.76	0.18	4.81	2.21	7.02
35	2.53	0.35	0.11	0.78	0.43	0.89	0.21	5.31	2.61	7.92
40	2.99	0.35	0.12	0.78	0.43	1.09	0.26	6.02	3.17	9.19
45	3.71	0.35	0.12	0.78	0.43	1.39	0.33	7.11	4.04	11.15
50	4.95	0.35	0.13	0.78	0.43	1.91	0.45	9.01	5.58	14.59

Table VOC TW 50
Financial Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.37	0.35	0.09	0.90	0.49	0.43	0.10	3.73	1.25	4.98
5	1.47	0.35	0.09	0.90	0.49	0.47	0.11	3.88	1.37	5.25
10	1.59	0.35	0.09	0.90	0.49	0.52	0.12	4.06	1.51	5.57
15	1.73	0.35	0.10	0.90	0.49	0.58	0.14	4.29	1.68	5.97
20	1.92	0.35	0.10	0.90	0.49	0.65	0.15	4.57	1.90	6.47
25	2.16	0.35	0.11	0.90	0.49	0.75	0.18	4.93	2.18	7.11
30	2.47	0.35	0.11	0.90	0.49	0.88	0.21	5.41	2.56	7.98
35	2.92	0.35	0.12	0.90	0.49	1.06	0.25	6.10	3.10	9.20
40	3.60	0.35	0.12	0.90	0.49	1.35	0.32	7.13	3.93	11.06
45	4.77	0.35	0.13	0.90	0.49	1.84	0.43	8.91	5.37	14.28
50	7.26	0.35	0.13	0.90	0.49	2.90	0.68	12.71	8.47	21.18

Table VOC TW 51
Financial Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 11000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.44	0.35	0.09	1.01	0.56	0.46	0.11	4.03	1.36	5.38
5	1.56	0.35	0.09	1.01	0.56	0.51	0.12	4.21	1.49	5.70
10	1.70	0.35	0.10	1.01	0.56	0.57	0.13	4.43	1.66	6.09
15	1.88	0.35	0.10	1.01	0.56	0.64	0.15	4.70	1.87	6.58
20	2.11	0.35	0.11	1.01	0.56	0.74	0.17	5.05	2.15	7.20
25	2.42	0.35	0.11	1.01	0.56	0.86	0.20	5.52	2.52	8.04
30	2.85	0.35	0.12	1.01	0.56	1.04	0.24	6.18	3.04	9.21
35	3.50	0.35	0.12	1.01	0.56	1.31	0.31	7.17	3.83	10.99
40	4.60	0.35	0.13	1.01	0.56	1.77	0.42	8.84	5.17	14.01
45	6.86	0.35	0.13	1.01	0.56	2.74	0.64	12.30	7.99	20.29
50	14.47	0.35	0.14	1.01	0.56	6.00	1.41	23.95	17.52	41.46

Table VOC TW 52
Financial Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 12000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.53	0.35	0.09	1.13	0.62	0.51	0.12	4.35	1.48	5.83
5	1.67	0.35	0.10	1.13	0.62	0.56	0.13	4.57	1.64	6.21
10	1.85	0.35	0.10	1.13	0.62	0.63	0.15	4.84	1.85	6.69
15	2.07	0.35	0.11	1.13	0.62	0.73	0.17	5.18	2.12	7.30
20	2.37	0.35	0.11	1.13	0.62	0.85	0.20	5.63	2.47	8.10
25	2.79	0.35	0.12	1.13	0.62	1.02	0.24	6.26	2.97	9.24
30	3.40	0.35	0.12	1.13	0.62	1.28	0.30	7.21	3.73	10.93
35	4.43	0.35	0.13	1.13	0.62	1.71	0.40	8.78	4.99	13.77
40	6.50	0.35	0.13	1.13	0.62	2.59	0.61	11.94	7.56	19.50
45	12.92	0.35	0.13	1.13	0.62	5.35	1.26	21.76	15.59	37.36
50	15.79	0.35	0.14	1.13	0.62	6.57	1.55	26.15	19.16	45.31

Table VOC TW 53
Financial Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 13000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.64	0.35	0.10	1.25	0.68	0.56	0.13	4.71	1.62	6.33
5	1.81	0.35	0.10	1.25	0.68	0.63	0.15	4.97	1.83	6.80
10	2.03	0.35	0.11	1.25	0.68	0.71	0.17	5.30	2.08	7.39
15	2.32	0.35	0.11	1.25	0.68	0.83	0.20	5.74	2.43	8.17
20	2.72	0.35	0.12	1.25	0.68	1.00	0.23	6.35	2.91	9.26
25	3.31	0.35	0.12	1.25	0.68	1.24	0.29	7.25	3.63	10.89
30	4.28	0.35	0.12	1.25	0.68	1.65	0.39	8.73	4.82	13.56
35	6.18	0.35	0.13	1.25	0.68	2.46	0.58	11.64	7.18	18.82
40	11.68	0.35	0.13	1.25	0.68	4.82	1.13	20.05	14.05	34.10
45	14.90	0.35	0.14	1.25	0.68	6.19	1.46	24.97	18.07	43.04
50	17.33	0.35	0.14	1.25	0.68	7.23	1.70	28.68	21.08	49.76

Table VOC TW 54
Financial Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 14000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.78	0.35	0.10	1.36	0.75	0.62	0.15	5.11	1.80	6.91
5	1.99	0.35	0.11	1.36	0.75	0.70	0.17	5.43	2.05	7.49
10	2.27	0.35	0.11	1.36	0.75	0.82	0.19	5.86	2.39	8.25
15	2.66	0.35	0.11	1.36	0.75	0.98	0.23	6.45	2.85	9.30
20	3.22	0.35	0.12	1.36	0.75	1.21	0.29	7.31	3.54	10.85
25	4.14	0.35	0.12	1.36	0.75	1.60	0.38	8.70	4.67	13.37
30	5.89	0.35	0.13	1.36	0.75	2.34	0.55	11.38	6.84	18.21
35	10.65	0.35	0.13	1.36	0.75	4.38	1.03	18.67	12.79	31.45
40	14.88	0.35	0.14	1.36	0.75	6.19	1.46	25.14	18.07	43.20
45	17.31	0.35	0.14	1.36	0.75	7.23	1.70	28.84	21.08	49.92
50	25.73	0.35	0.15	1.36	0.75	10.84	2.55	41.73	31.62	73.35

Table VOC TW 55
Financial Cost of Operation of Two Wheelers on Single Lane Roads (Rs/km)

Roughness = 15000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.95	0.35	0.11	1.48	0.81	0.69	0.16	5.56	2.03	7.59
5	2.22	0.35	0.11	1.48	0.81	0.81	0.19	5.97	2.35	8.32
10	2.60	0.35	0.11	1.48	0.81	0.96	0.23	6.54	2.80	9.34
15	3.14	0.35	0.12	1.48	0.81	1.18	0.28	7.37	3.45	10.82
20	4.00	0.35	0.12	1.48	0.81	1.55	0.36	8.69	4.52	13.20
25	5.62	0.35	0.13	1.48	0.81	2.24	0.53	11.16	6.52	17.68
30	9.79	0.35	0.13	1.48	0.81	4.02	0.95	17.54	11.73	29.27
35	14.87	0.35	0.14	1.48	0.81	6.19	1.46	25.30	18.07	43.37
40	17.29	0.35	0.14	1.48	0.81	7.23	1.70	29.00	21.08	50.08
45	25.71	0.35	0.15	1.48	0.81	10.84	2.55	41.89	31.62	73.51
50	50.91	0.35	0.15	1.48	0.81	21.68	5.10	80.49	63.24	143.73

Table VOC TW 56
Financial Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.14	0.04	0.05	0.03	0.02	0.24	0.06	1.58	0.70	2.28
5	1.15	0.04	0.06	0.03	0.02	0.25	0.06	1.62	0.73	2.35
10	1.18	0.04	0.06	0.03	0.02	0.27	0.06	1.66	0.78	2.44
15	1.20	0.04	0.07	0.03	0.02	0.28	0.07	1.71	0.82	2.53
20	1.24	0.04	0.07	0.03	0.02	0.30	0.07	1.77	0.87	2.64
25	1.28	0.04	0.08	0.03	0.02	0.32	0.08	1.84	0.93	2.77
30	1.33	0.04	0.08	0.03	0.02	0.34	0.08	1.93	1.00	2.92
35	1.39	0.04	0.08	0.03	0.02	0.37	0.09	2.02	1.07	3.10
40	1.46	0.04	0.09	0.03	0.02	0.40	0.09	2.14	1.16	3.30
45	1.55	0.04	0.09	0.03	0.02	0.43	0.10	2.27	1.27	3.54
50	1.65	0.04	0.10	0.03	0.02	0.48	0.11	2.44	1.39	3.83

Table VOC TW 57
Financial Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.14	0.04	0.05	0.08	0.04	0.25	0.06	1.66	0.72	2.38
5	1.16	0.04	0.06	0.08	0.04	0.26	0.06	1.71	0.76	2.46
10	1.18	0.04	0.06	0.08	0.04	0.28	0.06	1.75	0.80	2.56
15	1.22	0.04	0.07	0.08	0.04	0.29	0.07	1.81	0.85	2.66
20	1.25	0.05	0.07	0.08	0.04	0.31	0.07	1.88	0.91	2.78
25	1.30	0.05	0.08	0.08	0.04	0.33	0.08	1.96	0.97	2.93
30	1.36	0.05	0.08	0.08	0.04	0.36	0.08	2.05	1.04	3.09
35	1.42	0.05	0.09	0.08	0.04	0.39	0.09	2.15	1.13	3.28
40	1.50	0.05	0.09	0.08	0.04	0.42	0.10	2.28	1.22	3.51
45	1.60	0.05	0.10	0.08	0.04	0.46	0.11	2.44	1.34	3.78
50	1.72	0.05	0.10	0.08	0.04	0.51	0.12	2.62	1.48	4.10

Table VOC TW 58
Financial Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.14	0.05	0.06	0.20	0.11	0.25	0.06	1.87	0.74	2.61
5	1.17	0.05	0.06	0.20	0.11	0.27	0.06	1.91	0.79	2.70
10	1.20	0.05	0.07	0.20	0.11	0.29	0.07	1.96	0.83	2.80
15	1.23	0.05	0.07	0.20	0.11	0.30	0.07	2.03	0.88	2.91
20	1.27	0.05	0.08	0.20	0.11	0.32	0.08	2.10	0.94	3.05
25	1.33	0.05	0.08	0.20	0.11	0.35	0.08	2.19	1.01	3.20
30	1.39	0.05	0.09	0.20	0.11	0.37	0.09	2.29	1.09	3.38
35	1.46	0.05	0.09	0.20	0.11	0.41	0.10	2.41	1.18	3.59
40	1.55	0.05	0.09	0.20	0.11	0.44	0.10	2.55	1.29	3.84
45	1.66	0.05	0.10	0.20	0.11	0.49	0.11	2.72	1.42	4.15
50	1.80	0.06	0.10	0.20	0.11	0.54	0.13	2.93	1.59	4.52

Table VOC TW 59
Financial Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.15	0.05	0.06	0.31	0.17	0.26	0.06	2.07	0.77	2.84
5	1.18	0.05	0.06	0.31	0.17	0.28	0.07	2.12	0.81	2.93
10	1.21	0.05	0.07	0.31	0.17	0.30	0.07	2.18	0.86	3.04
15	1.25	0.05	0.07	0.31	0.17	0.32	0.07	2.25	0.92	3.17
20	1.30	0.06	0.08	0.31	0.17	0.34	0.08	2.33	0.98	3.32
25	1.35	0.06	0.08	0.31	0.17	0.36	0.09	2.43	1.06	3.49
30	1.42	0.06	0.09	0.31	0.17	0.39	0.09	2.54	1.15	3.68
35	1.51	0.06	0.09	0.31	0.17	0.43	0.10	2.67	1.25	3.92
40	1.61	0.06	0.10	0.31	0.17	0.47	0.11	2.83	1.37	4.20
45	1.74	0.06	0.10	0.31	0.17	0.52	0.12	3.02	1.52	4.54
50	1.89	0.06	0.11	0.31	0.17	0.58	0.14	3.26	1.70	4.97

Table VOC TW 60
Financial Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.16	0.06	0.06	0.43	0.24	0.27	0.06	2.28	0.80	3.08
5	1.19	0.06	0.07	0.43	0.24	0.29	0.07	2.34	0.84	3.18
10	1.22	0.06	0.07	0.43	0.24	0.31	0.07	2.40	0.90	3.30
15	1.27	0.06	0.08	0.43	0.24	0.33	0.08	2.48	0.96	3.44
20	1.32	0.06	0.08	0.43	0.24	0.35	0.08	2.57	1.03	3.60
25	1.39	0.06	0.09	0.43	0.24	0.38	0.09	2.67	1.11	3.78
30	1.47	0.07	0.09	0.43	0.24	0.41	0.10	2.80	1.21	4.00
35	1.56	0.07	0.09	0.43	0.24	0.45	0.11	2.95	1.32	4.27
40	1.68	0.07	0.10	0.43	0.24	0.50	0.12	3.13	1.46	4.58
45	1.82	0.07	0.10	0.43	0.24	0.56	0.13	3.35	1.63	4.97
50	2.00	0.07	0.11	0.43	0.24	0.63	0.15	3.62	1.84	5.46

Table VOC TW 61
Financial Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.17	0.07	0.07	0.55	0.30	0.28	0.07	2.49	0.82	3.32
5	1.20	0.07	0.07	0.55	0.30	0.30	0.07	2.56	0.88	3.43
10	1.24	0.07	0.07	0.55	0.30	0.32	0.08	2.63	0.93	3.56
15	1.29	0.07	0.08	0.55	0.30	0.34	0.08	2.71	1.00	3.71
20	1.35	0.07	0.08	0.55	0.30	0.37	0.09	2.81	1.08	3.89
25	1.43	0.07	0.09	0.55	0.30	0.40	0.09	2.93	1.17	4.10
30	1.52	0.08	0.09	0.55	0.30	0.44	0.10	3.07	1.27	4.34
35	1.62	0.08	0.10	0.55	0.30	0.48	0.11	3.24	1.40	4.64
40	1.75	0.08	0.10	0.55	0.30	0.53	0.13	3.44	1.56	5.00
45	1.92	0.08	0.11	0.55	0.30	0.60	0.14	3.69	1.75	5.44
50	2.13	0.08	0.11	0.55	0.30	0.69	0.16	4.02	2.00	6.02

Table VOC TW 62
Financial Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.18	0.08	0.07	0.66	0.36	0.29	0.07	2.71	0.85	3.57
5	1.22	0.08	0.07	0.66	0.36	0.31	0.07	2.78	0.91	3.69
10	1.27	0.08	0.08	0.66	0.36	0.33	0.08	2.86	0.97	3.84
15	1.32	0.08	0.08	0.66	0.36	0.36	0.08	2.96	1.05	4.00
20	1.39	0.09	0.09	0.66	0.36	0.39	0.09	3.07	1.13	4.20
25	1.47	0.09	0.09	0.66	0.36	0.42	0.10	3.20	1.23	4.43
30	1.57	0.09	0.10	0.66	0.36	0.46	0.11	3.35	1.35	4.70
35	1.69	0.09	0.10	0.66	0.36	0.51	0.12	3.54	1.49	5.03
40	1.84	0.10	0.10	0.66	0.36	0.57	0.13	3.78	1.67	5.44
45	2.03	0.10	0.11	0.66	0.36	0.65	0.15	4.07	1.90	5.96
50	2.28	0.10	0.11	0.66	0.36	0.75	0.18	4.45	2.19	6.64

Table VOC TW 63
Financial Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.20	0.09	0.07	0.78	0.43	0.30	0.07	2.94	0.89	3.83
5	1.24	0.10	0.08	0.78	0.43	0.32	0.08	3.02	0.95	3.97
10	1.29	0.10	0.08	0.78	0.43	0.35	0.08	3.11	1.02	4.12
15	1.35	0.10	0.08	0.78	0.43	0.38	0.09	3.21	1.10	4.31
20	1.43	0.10	0.09	0.78	0.43	0.41	0.10	3.33	1.19	4.52
25	1.52	0.11	0.09	0.78	0.43	0.45	0.10	3.48	1.30	4.78
30	1.63	0.11	0.10	0.78	0.43	0.49	0.12	3.66	1.43	5.09
35	1.77	0.12	0.10	0.78	0.43	0.55	0.13	3.87	1.60	5.47
40	1.94	0.12	0.11	0.78	0.43	0.62	0.15	4.14	1.80	5.94
45	2.17	0.13	0.11	0.78	0.43	0.71	0.17	4.49	2.07	6.55
50	2.47	0.13	0.12	0.78	0.43	0.83	0.20	4.95	2.42	7.37

Table VOC TW 64
Financial Cost of Operation of Two Wheelers on Intermediate Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.21	0.11	0.07	0.90	0.49	0.32	0.07	3.18	0.92	4.10
5	1.26	0.12	0.08	0.90	0.49	0.34	0.08	3.27	0.99	4.25
10	1.32	0.12	0.08	0.90	0.49	0.36	0.09	3.37	1.06	4.43
15	1.39	0.13	0.09	0.90	0.49	0.39	0.09	3.48	1.15	4.63
20	1.48	0.13	0.09	0.90	0.49	0.43	0.10	3.62	1.25	4.88
25	1.58	0.14	0.10	0.90	0.49	0.47	0.11	3.79	1.38	5.17
30	1.71	0.15	0.10	0.90	0.49	0.52	0.12	3.99	1.53	5.52
35	1.87	0.15	0.11	0.90	0.49	0.59	0.14	4.24	1.71	5.95
40	2.07	0.16	0.11	0.90	0.49	0.67	0.16	4.55	1.95	6.51
45	2.33	0.17	0.11	0.90	0.49	0.78	0.18	4.97	2.27	7.24
50	2.70	0.18	0.12	0.90	0.49	0.93	0.22	5.53	2.71	8.24

Table VOC TW 65
Financial Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.14	0.04	0.05	0.03	0.02	0.24	0.06	1.58	0.98	2.56
5	1.16	0.04	0.06	0.03	0.02	0.25	0.06	1.61	1.03	2.64
10	1.18	0.04	0.06	0.03	0.02	0.26	0.06	1.65	1.09	2.74
15	1.20	0.04	0.06	0.03	0.02	0.28	0.07	1.70	1.15	2.85
20	1.23	0.04	0.07	0.03	0.02	0.29	0.07	1.76	1.22	2.98
25	1.27	0.04	0.07	0.03	0.02	0.31	0.07	1.83	1.30	3.12
30	1.32	0.04	0.08	0.03	0.02	0.33	0.08	1.90	1.39	3.29
35	1.37	0.04	0.08	0.03	0.02	0.36	0.08	1.99	1.49	3.48
40	1.44	0.04	0.09	0.03	0.02	0.39	0.09	2.10	1.61	3.71
45	1.52	0.04	0.09	0.03	0.02	0.42	0.10	2.23	1.75	3.97
50	1.62	0.04	0.10	0.03	0.02	0.46	0.11	2.38	1.91	4.29

Table VOC TW 66
Financial Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.15	0.04	0.05	0.08	0.04	0.24	0.06	1.66	1.01	2.66
5	1.16	0.04	0.06	0.08	0.04	0.25	0.06	1.70	1.06	2.75
10	1.18	0.04	0.06	0.08	0.04	0.27	0.06	1.74	1.12	2.86
15	1.21	0.04	0.07	0.08	0.04	0.28	0.07	1.79	1.18	2.98
20	1.25	0.04	0.07	0.08	0.04	0.30	0.07	1.86	1.26	3.11
25	1.29	0.04	0.08	0.08	0.04	0.32	0.08	1.93	1.34	3.27
30	1.34	0.04	0.08	0.08	0.04	0.34	0.08	2.01	1.43	3.44
35	1.40	0.04	0.09	0.08	0.04	0.37	0.09	2.11	1.54	3.65
40	1.47	0.05	0.09	0.08	0.04	0.40	0.09	2.23	1.67	3.90
45	1.56	0.05	0.09	0.08	0.04	0.44	0.10	2.36	1.82	4.18
50	1.67	0.05	0.10	0.08	0.04	0.48	0.11	2.53	2.00	4.53

Table VOC TW 67
Financial Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.15	0.04	0.06	0.20	0.11	0.25	0.06	1.86	1.03	2.89
5	1.17	0.04	0.06	0.20	0.11	0.26	0.06	1.90	1.09	2.98
10	1.19	0.04	0.06	0.20	0.11	0.28	0.06	1.95	1.15	3.09
15	1.22	0.05	0.07	0.20	0.11	0.29	0.07	2.00	1.22	3.22
20	1.26	0.05	0.07	0.20	0.11	0.31	0.07	2.07	1.29	3.36
25	1.31	0.05	0.08	0.20	0.11	0.33	0.08	2.15	1.38	3.53
30	1.36	0.05	0.08	0.20	0.11	0.36	0.08	2.24	1.48	3.72
35	1.43	0.05	0.09	0.20	0.11	0.38	0.09	2.34	1.60	3.94
40	1.51	0.05	0.09	0.20	0.11	0.42	0.10	2.47	1.74	4.21
45	1.61	0.05	0.10	0.20	0.11	0.46	0.11	2.62	1.90	4.52
50	1.72	0.05	0.10	0.20	0.11	0.50	0.12	2.80	2.10	4.90

Table VOC TW 68
Financial Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.15	0.05	0.06	0.31	0.17	0.25	0.06	2.05	1.06	3.11
5	1.18	0.05	0.06	0.31	0.17	0.27	0.06	2.10	1.11	3.21
10	1.20	0.05	0.07	0.31	0.17	0.28	0.07	2.15	1.18	3.33
15	1.24	0.05	0.07	0.31	0.17	0.30	0.07	2.21	1.25	3.46
20	1.28	0.05	0.08	0.31	0.17	0.32	0.08	2.28	1.33	3.62
25	1.33	0.05	0.08	0.31	0.17	0.34	0.08	2.37	1.43	3.80
30	1.39	0.05	0.08	0.31	0.17	0.37	0.09	2.47	1.54	4.00
35	1.46	0.05	0.09	0.31	0.17	0.40	0.09	2.58	1.66	4.25
40	1.55	0.05	0.09	0.31	0.17	0.44	0.10	2.72	1.81	4.53
45	1.66	0.05	0.10	0.31	0.17	0.48	0.11	2.88	1.99	4.88
50	1.78	0.05	0.10	0.31	0.17	0.53	0.13	3.08	2.21	5.29

Table VOC TW 69
Financial Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.16	0.05	0.06	0.43	0.24	0.26	0.06	2.26	1.08	3.34
5	1.18	0.05	0.06	0.43	0.24	0.27	0.06	2.30	1.14	3.45
10	1.22	0.05	0.07	0.43	0.24	0.29	0.07	2.36	1.21	3.57
15	1.25	0.05	0.07	0.43	0.24	0.31	0.07	2.43	1.29	3.72
20	1.30	0.05	0.08	0.43	0.24	0.33	0.08	2.50	1.38	3.88
25	1.35	0.05	0.08	0.43	0.24	0.36	0.08	2.59	1.48	4.07
30	1.42	0.06	0.09	0.43	0.24	0.38	0.09	2.70	1.60	4.30
35	1.50	0.06	0.09	0.43	0.24	0.42	0.10	2.83	1.73	4.56
40	1.59	0.06	0.10	0.43	0.24	0.46	0.11	2.97	1.90	4.87
45	1.71	0.06	0.10	0.43	0.24	0.50	0.12	3.15	2.09	5.25
50	1.85	0.06	0.11	0.43	0.24	0.56	0.13	3.38	2.33	5.71

Table VOC TW 70
Financial Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.17	0.06	0.06	0.55	0.30	0.27	0.06	2.46	1.11	3.57
5	1.19	0.06	0.07	0.55	0.30	0.28	0.07	2.51	1.18	3.69
10	1.23	0.06	0.07	0.55	0.30	0.30	0.07	2.57	1.25	3.82
15	1.27	0.06	0.08	0.55	0.30	0.32	0.08	2.64	1.33	3.97
20	1.32	0.06	0.08	0.55	0.30	0.34	0.08	2.73	1.42	4.15
25	1.38	0.06	0.08	0.55	0.30	0.37	0.09	2.82	1.53	4.36
30	1.45	0.06	0.09	0.55	0.30	0.40	0.09	2.94	1.66	4.60
35	1.54	0.06	0.09	0.55	0.30	0.43	0.10	3.08	1.81	4.88
40	1.64	0.06	0.10	0.55	0.30	0.48	0.11	3.24	1.98	5.22
45	1.77	0.07	0.10	0.55	0.30	0.53	0.12	3.44	2.20	5.64
50	1.93	0.07	0.11	0.55	0.30	0.59	0.14	3.68	2.47	6.15

Table VOC TW 71
Financial Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.18	0.06	0.06	0.66	0.36	0.27	0.06	2.66	1.14	3.81
5	1.21	0.06	0.07	0.66	0.36	0.29	0.07	2.72	1.21	3.93
10	1.24	0.06	0.07	0.66	0.36	0.31	0.07	2.79	1.29	4.07
15	1.29	0.06	0.08	0.66	0.36	0.33	0.08	2.86	1.37	4.24
20	1.34	0.07	0.08	0.66	0.36	0.35	0.08	2.95	1.47	4.43
25	1.41	0.07	0.09	0.66	0.36	0.38	0.09	3.06	1.59	4.65
30	1.49	0.07	0.09	0.66	0.36	0.42	0.10	3.19	1.73	4.91
35	1.58	0.07	0.10	0.66	0.36	0.45	0.11	3.33	1.89	5.22
40	1.70	0.07	0.10	0.66	0.36	0.50	0.12	3.51	2.08	5.60
45	1.84	0.07	0.10	0.66	0.36	0.56	0.13	3.73	2.32	6.06
50	2.02	0.08	0.11	0.66	0.36	0.63	0.15	4.01	2.62	6.63

Table VOC TW 72
Financial Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.19	0.07	0.07	0.78	0.43	0.28	0.07	2.87	1.17	4.05
5	1.22	0.07	0.07	0.78	0.43	0.30	0.07	2.93	1.25	4.18
10	1.26	0.07	0.07	0.78	0.43	0.32	0.08	3.01	1.33	4.33
15	1.31	0.07	0.08	0.78	0.43	0.34	0.08	3.09	1.42	4.51
20	1.37	0.07	0.08	0.78	0.43	0.37	0.09	3.19	1.53	4.72
25	1.44	0.08	0.09	0.78	0.43	0.40	0.09	3.30	1.65	4.96
30	1.53	0.08	0.09	0.78	0.43	0.43	0.10	3.44	1.80	5.24
35	1.63	0.08	0.10	0.78	0.43	0.48	0.11	3.60	1.98	5.58
40	1.76	0.08	0.10	0.78	0.43	0.53	0.12	3.80	2.19	5.99
45	1.92	0.08	0.11	0.78	0.43	0.59	0.14	4.04	2.46	6.50
50	2.12	0.09	0.11	0.78	0.43	0.67	0.16	4.35	2.80	7.15

Table VOC TW 73
Financial Cost of Operation of Two Wheelers on Two Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.20	0.08	0.07	0.90	0.49	0.29	0.07	3.09	1.21	4.29
5	1.23	0.08	0.07	0.90	0.49	0.31	0.07	3.15	1.28	4.44
10	1.28	0.08	0.08	0.90	0.49	0.33	0.08	3.23	1.37	4.60
15	1.33	0.08	0.08	0.90	0.49	0.35	0.08	3.32	1.47	4.79
20	1.40	0.08	0.09	0.90	0.49	0.38	0.09	3.43	1.59	5.01
25	1.48	0.09	0.09	0.90	0.49	0.41	0.10	3.55	1.72	5.27
30	1.57	0.09	0.10	0.90	0.49	0.45	0.11	3.70	1.88	5.58
35	1.68	0.09	0.10	0.90	0.49	0.50	0.12	3.88	2.07	5.95
40	1.82	0.09	0.10	0.90	0.49	0.56	0.13	4.10	2.31	6.41
45	2.00	0.10	0.11	0.90	0.49	0.63	0.15	4.37	2.61	6.98
50	2.23	0.10	0.11	0.90	0.49	0.72	0.17	4.72	3.00	7.72

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Table VOC TW 74
Financial Cost of Operation of Two Wheelers on Four Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.16	0.04	0.05	0.03	0.02	0.22	0.05	1.58	0.93	2.50
5	1.17	0.04	0.05	0.03	0.02	0.23	0.06	1.60	0.97	2.58
10	1.18	0.04	0.06	0.03	0.02	0.25	0.06	1.64	1.03	2.66
15	1.20	0.04	0.06	0.03	0.02	0.26	0.06	1.68	1.09	2.76
20	1.23	0.04	0.07	0.03	0.02	0.28	0.07	1.73	1.15	2.88
25	1.26	0.04	0.07	0.03	0.02	0.29	0.07	1.79	1.22	3.01
30	1.30	0.04	0.08	0.03	0.02	0.31	0.07	1.86	1.31	3.17
35	1.35	0.04	0.08	0.03	0.02	0.34	0.08	1.94	1.41	3.35
40	1.41	0.04	0.09	0.03	0.02	0.36	0.09	2.04	1.52	3.56
45	1.48	0.04	0.09	0.03	0.02	0.40	0.09	2.16	1.65	3.80
50	1.57	0.04	0.09	0.03	0.02	0.43	0.10	2.30	1.80	4.10

Table VOC TW 75
Financial Cost of Operation of Two Wheelers on Four Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.16	0.04	0.05	0.08	0.04	0.23	0.05	1.65	0.95	2.60
5	1.17	0.04	0.05	0.08	0.04	0.24	0.06	1.68	1.00	2.68
10	1.19	0.04	0.06	0.08	0.04	0.25	0.06	1.72	1.05	2.77
15	1.21	0.04	0.06	0.08	0.04	0.27	0.06	1.77	1.12	2.88
20	1.24	0.04	0.07	0.08	0.04	0.28	0.07	1.82	1.18	3.00
25	1.28	0.04	0.07	0.08	0.04	0.30	0.07	1.88	1.26	3.15
30	1.32	0.04	0.08	0.08	0.04	0.33	0.08	1.96	1.35	3.31
35	1.37	0.04	0.08	0.08	0.04	0.35	0.08	2.05	1.46	3.51
40	1.44	0.04	0.09	0.08	0.04	0.38	0.09	2.16	1.58	3.73
45	1.52	0.04	0.09	0.08	0.04	0.41	0.10	2.28	1.72	4.00
50	1.62	0.04	0.10	0.08	0.04	0.45	0.11	2.44	1.89	4.33

Table VOC TW 76
Financial Cost of Operation of Two Wheelers on Four Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.16	0.04	0.05	0.20	0.11	0.23	0.05	1.84	0.97	2.82
5	1.18	0.04	0.06	0.20	0.11	0.25	0.06	1.88	1.02	2.90
10	1.20	0.04	0.06	0.20	0.11	0.26	0.06	1.92	1.08	3.00
15	1.22	0.04	0.06	0.20	0.11	0.28	0.06	1.97	1.15	3.12
20	1.25	0.04	0.07	0.20	0.11	0.29	0.07	2.03	1.22	3.25
25	1.29	0.04	0.07	0.20	0.11	0.31	0.07	2.10	1.30	3.40
30	1.34	0.04	0.08	0.20	0.11	0.34	0.08	2.18	1.40	3.58
35	1.40	0.04	0.08	0.20	0.11	0.36	0.09	2.28	1.51	3.79
40	1.47	0.04	0.09	0.20	0.11	0.39	0.09	2.39	1.64	4.03
45	1.56	0.04	0.09	0.20	0.11	0.43	0.10	2.53	1.80	4.33
50	1.67	0.04	0.10	0.20	0.11	0.48	0.11	2.70	1.98	4.68

Table VOC TW 77
Financial Cost of Operation of Two Wheelers on Four Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.17	0.04	0.05	0.31	0.17	0.24	0.06	2.04	1.00	3.03
5	1.18	0.04	0.06	0.31	0.17	0.25	0.06	2.07	1.05	3.12
10	1.20	0.04	0.06	0.31	0.17	0.27	0.06	2.12	1.11	3.23
15	1.23	0.04	0.07	0.31	0.17	0.28	0.07	2.17	1.18	3.35
20	1.27	0.04	0.07	0.31	0.17	0.30	0.07	2.23	1.26	3.49
25	1.31	0.04	0.08	0.31	0.17	0.32	0.08	2.31	1.35	3.66
30	1.36	0.04	0.08	0.31	0.17	0.35	0.08	2.40	1.45	3.85
35	1.43	0.04	0.08	0.31	0.17	0.38	0.09	2.51	1.57	4.08
40	1.51	0.04	0.09	0.31	0.17	0.41	0.10	2.63	1.71	4.34
45	1.61	0.04	0.09	0.31	0.17	0.45	0.11	2.78	1.88	4.66
50	1.73	0.04	0.10	0.31	0.17	0.50	0.12	2.97	2.09	5.06

Table VOC TW 78
Financial Cost of Operation of Two Wheelers on Four Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.17	0.04	0.05	0.43	0.24	0.25	0.06	2.23	1.02	3.25
5	1.19	0.04	0.06	0.43	0.24	0.26	0.06	2.27	1.08	3.35
10	1.21	0.04	0.06	0.43	0.24	0.28	0.06	2.32	1.14	3.46
15	1.24	0.04	0.07	0.43	0.24	0.29	0.07	2.38	1.22	3.59
20	1.28	0.04	0.07	0.43	0.24	0.31	0.07	2.45	1.30	3.75
25	1.33	0.04	0.08	0.43	0.24	0.34	0.08	2.53	1.40	3.92
30	1.39	0.04	0.08	0.43	0.24	0.36	0.09	2.62	1.51	4.13
35	1.46	0.04	0.09	0.43	0.24	0.39	0.09	2.74	1.64	4.38
40	1.55	0.05	0.09	0.43	0.24	0.43	0.10	2.88	1.79	4.67
45	1.66	0.05	0.09	0.43	0.24	0.47	0.11	3.05	1.97	5.02
50	1.79	0.05	0.10	0.43	0.24	0.53	0.12	3.25	2.20	5.45

Table VOC TW 79
Financial Cost of Operation of Two Wheelers on Four Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.17	0.04	0.05	0.55	0.30	0.25	0.06	2.42	1.05	3.47
5	1.19	0.04	0.06	0.55	0.30	0.27	0.06	2.47	1.11	3.58
10	1.22	0.04	0.06	0.55	0.30	0.28	0.07	2.52	1.18	3.70
15	1.26	0.04	0.07	0.55	0.30	0.30	0.07	2.59	1.26	3.84
20	1.30	0.04	0.07	0.55	0.30	0.32	0.08	2.66	1.34	4.01
25	1.35	0.04	0.08	0.55	0.30	0.35	0.08	2.75	1.45	4.20
30	1.42	0.05	0.08	0.55	0.30	0.38	0.09	2.85	1.57	4.42
35	1.50	0.05	0.09	0.55	0.30	0.41	0.10	2.98	1.71	4.69
40	1.59	0.05	0.09	0.55	0.30	0.45	0.11	3.13	1.87	5.00
45	1.71	0.05	0.10	0.55	0.30	0.50	0.12	3.32	2.08	5.39
50	1.86	0.05	0.10	0.55	0.30	0.56	0.13	3.55	2.33	5.88

Table VOC TW 80
Financial Cost of Operation of Two Wheelers on Four Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.18	0.04	0.06	0.66	0.36	0.26	0.06	2.62	1.08	3.70
5	1.20	0.04	0.06	0.66	0.36	0.27	0.06	2.67	1.14	3.81
10	1.23	0.04	0.06	0.66	0.36	0.29	0.07	2.73	1.21	3.94
15	1.27	0.05	0.07	0.66	0.36	0.31	0.07	2.80	1.30	4.09
20	1.32	0.05	0.07	0.66	0.36	0.33	0.08	2.88	1.39	4.27
25	1.38	0.05	0.08	0.66	0.36	0.36	0.08	2.97	1.50	4.48
30	1.45	0.05	0.08	0.66	0.36	0.39	0.09	3.09	1.63	4.72
35	1.54	0.05	0.09	0.66	0.36	0.43	0.10	3.23	1.78	5.01
40	1.64	0.05	0.09	0.66	0.36	0.47	0.11	3.39	1.96	5.36
45	1.77	0.05	0.10	0.66	0.36	0.53	0.12	3.60	2.19	5.79
50	1.94	0.05	0.10	0.66	0.36	0.59	0.14	3.85	2.47	6.33

Table VOC TW 81
Financial Cost of Operation of Two Wheelers on Four Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.19	0.04	0.06	0.78	0.43	0.27	0.06	2.82	1.11	3.93
5	1.21	0.05	0.06	0.78	0.43	0.28	0.07	2.87	1.18	4.05
10	1.25	0.05	0.07	0.78	0.43	0.30	0.07	2.94	1.25	4.19
15	1.29	0.05	0.07	0.78	0.43	0.32	0.08	3.01	1.34	4.35
20	1.34	0.05	0.07	0.78	0.43	0.35	0.08	3.10	1.44	4.54
25	1.41	0.05	0.08	0.78	0.43	0.37	0.09	3.20	1.56	4.76
30	1.49	0.05	0.08	0.78	0.43	0.41	0.10	3.33	1.70	5.03
35	1.58	0.05	0.09	0.78	0.43	0.45	0.11	3.48	1.86	5.34
40	1.70	0.05	0.09	0.78	0.43	0.50	0.12	3.66	2.07	5.73
45	1.85	0.05	0.10	0.78	0.43	0.56	0.13	3.89	2.32	6.21
50	2.03	0.05	0.10	0.78	0.43	0.63	0.15	4.18	2.64	6.82

Table VOC TW 82
Financial Cost of Operation of Two Wheelers on Four Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Total Cost	Passenger Cost	Grand Cost
0	1.19	0.05	0.06	0.90	0.49	0.27	0.06	3.02	1.14	4.16
5	1.22	0.05	0.06	0.90	0.49	0.29	0.07	3.08	1.21	4.29
10	1.26	0.05	0.07	0.90	0.49	0.31	0.07	3.15	1.29	4.44
15	1.31	0.05	0.07	0.90	0.49	0.33	0.08	3.23	1.39	4.62
20	1.37	0.05	0.08	0.90	0.49	0.36	0.08	3.32	1.50	4.82
25	1.44	0.05	0.08	0.90	0.49	0.39	0.09	3.44	1.62	5.06
30	1.52	0.05	0.08	0.90	0.49	0.43	0.10	3.57	1.77	5.35
35	1.63	0.05	0.09	0.90	0.49	0.47	0.11	3.74	1.96	5.70
40	1.76	0.05	0.09	0.90	0.49	0.52	0.12	3.94	2.18	6.12
45	1.93	0.05	0.10	0.90	0.49	0.59	0.14	4.20	2.46	6.66
50	2.14	0.05	0.10	0.90	0.49	0.68	0.16	4.52	2.82	7.35

VOC Tables for Buses

(Clause 6.9)

Table VOC BUS 1
Economic Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	2.99	0.99	0.13	0.04	0.02	0.41	0.16	0.67	0.19	1.26	6.86	6.81	13.77
5	3.13	1.04	0.13	0.04	0.02	0.42	0.23	0.69	0.20	1.31	7.22	7.08	14.44
10	3.27	1.10	0.13	0.04	0.02	0.44	0.24	0.72	0.21	1.36	7.54	7.37	15.05
15	3.43	1.16	0.13	0.04	0.02	0.45	0.25	0.75	0.21	1.42	7.88	7.68	15.71
20	3.59	1.23	0.13	0.04	0.02	0.47	0.26	0.78	0.22	1.49	8.25	8.02	16.43
25	3.77	1.31	0.13	0.04	0.02	0.49	0.27	0.82	0.23	1.55	8.65	8.39	17.20
30	3.95	1.40	0.14	0.04	0.02	0.51	0.28	0.86	0.25	1.63	9.08	8.80	18.05
35	4.15	1.51	0.14	0.04	0.02	0.53	0.29	0.91	0.26	1.71	9.56	9.25	18.99
40	4.36	1.63	0.14	0.05	0.02	0.55	0.30	0.95	0.27	1.81	10.08	9.75	20.01
45	4.59	1.78	0.14	0.05	0.03	0.57	0.31	1.01	0.29	1.91	10.66	10.31	21.16
50	4.84	1.95	0.14	0.05	0.03	0.59	0.32	1.07	0.31	2.02	11.31	10.93	22.44

Table VOC BUS 2
Economic Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.01	1.02	0.16	0.05	0.02	0.44	0.24	0.69	0.20	1.31	7.13	7.05	14.33
5	3.15	1.08	0.16	0.05	0.02	0.45	0.25	0.72	0.21	1.36	7.45	7.34	14.94
10	3.31	1.14	0.16	0.05	0.02	0.47	0.26	0.75	0.21	1.42	7.79	7.65	15.59
15	3.47	1.21	0.16	0.05	0.02	0.49	0.27	0.78	0.22	1.48	8.16	7.98	16.30
20	3.64	1.28	0.16	0.05	0.02	0.51	0.28	0.82	0.23	1.55	8.55	8.35	17.07
25	3.83	1.37	0.17	0.05	0.02	0.53	0.29	0.86	0.25	1.62	8.98	8.76	17.91
30	4.02	1.47	0.17	0.05	0.02	0.55	0.30	0.90	0.26	1.70	9.45	9.20	18.83
35	4.23	1.59	0.17	0.05	0.02	0.57	0.31	0.95	0.27	1.80	9.96	9.69	19.85
40	4.46	1.73	0.17	0.05	0.02	0.59	0.32	1.00	0.29	1.90	10.53	10.24	20.97
45	4.71	1.89	0.17	0.05	0.03	0.61	0.34	1.06	0.30	2.01	11.17	10.86	22.23
50	4.98	2.08	0.17	0.06	0.03	0.63	0.35	1.13	0.32	2.14	11.89	11.55	23.65

Table VOC BUS 3
Economic Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.03	1.06	0.19	0.06	0.02	0.47	0.26	0.71	0.20	1.35	7.37	7.30	14.83
5	3.19	1.12	0.19	0.06	0.02	0.49	0.27	0.74	0.21	1.41	7.70	7.61	15.48
10	3.35	1.18	0.19	0.06	0.02	0.51	0.28	0.78	0.22	1.47	8.06	7.95	16.18
15	3.52	1.26	0.20	0.06	0.02	0.53	0.29	0.81	0.23	1.54	8.46	8.31	16.94
20	3.70	1.34	0.20	0.06	0.02	0.55	0.30	0.85	0.24	1.61	8.88	8.71	17.77
25	3.90	1.44	0.20	0.06	0.02	0.57	0.31	0.90	0.26	1.70	9.34	9.15	18.68
30	4.11	1.55	0.20	0.06	0.02	0.59	0.32	0.94	0.27	1.79	9.85	9.64	19.68
35	4.33	1.68	0.20	0.06	0.02	0.61	0.33	1.00	0.28	1.89	10.41	10.18	20.79
40	4.58	1.83	0.20	0.06	0.02	0.63	0.35	1.06	0.30	2.00	11.03	10.79	22.03
45	4.84	2.02	0.20	0.06	0.03	0.66	0.36	1.12	0.32	2.12	11.74	11.47	23.43
50	5.14	2.24	0.20	0.06	0.03	0.68	0.37	1.20	0.34	2.27	12.54	12.25	25.01

Table VOC BUS 4
Economic Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.06	1.10	0.22	0.07	0.02	0.51	0.28	0.74	0.21	1.40	7.62	7.58	15.36
5	3.22	1.16	0.22	0.07	0.02	0.52	0.29	0.77	0.22	1.46	7.98	7.91	16.06
10	3.40	1.23	0.23	0.07	0.02	0.54	0.30	0.81	0.23	1.53	8.36	8.27	16.82
15	3.58	1.31	0.23	0.07	0.02	0.56	0.31	0.85	0.24	1.61	8.78	8.67	17.64
20	3.77	1.41	0.23	0.07	0.02	0.59	0.32	0.89	0.25	1.69	9.24	9.10	18.54
25	3.98	1.51	0.23	0.07	0.02	0.61	0.33	0.94	0.27	1.78	9.74	9.58	19.53
30	4.20	1.64	0.23	0.07	0.02	0.63	0.35	0.99	0.28	1.87	10.29	10.12	20.62
35	4.44	1.78	0.23	0.07	0.02	0.65	0.36	1.05	0.30	1.99	10.90	10.72	21.84
40	4.71	1.95	0.23	0.07	0.02	0.68	0.37	1.11	0.32	2.11	11.59	11.39	23.21
45	5.00	2.16	0.23	0.07	0.03	0.70	0.39	1.19	0.34	2.25	12.37	12.16	24.77
50	5.32	2.43	0.23	0.07	0.03	0.73	0.40	1.28	0.36	2.41	13.27	13.04	26.55

Table VOC BUS 5
Economic Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.10	1.14	0.26	0.08	0.02	0.54	0.30	0.77	0.22	1.46	7.89	7.87	15.94
5	3.27	1.21	0.26	0.08	0.02	0.56	0.31	0.81	0.23	1.52	8.27	8.23	16.69
10	3.45	1.29	0.26	0.08	0.02	0.59	0.32	0.84	0.24	1.60	8.69	8.62	17.51
15	3.64	1.38	0.26	0.08	0.02	0.61	0.33	0.89	0.25	1.68	9.14	9.05	18.40
20	3.85	1.48	0.26	0.08	0.02	0.63	0.35	0.93	0.27	1.77	9.63	9.53	19.37
25	4.07	1.59	0.26	0.08	0.02	0.65	0.36	0.98	0.28	1.86	10.17	10.06	20.45
30	4.31	1.73	0.26	0.08	0.02	0.68	0.37	1.04	0.30	1.97	10.78	10.65	21.66
35	4.58	1.89	0.26	0.08	0.02	0.70	0.39	1.11	0.32	2.10	11.45	11.32	23.00
40	4.86	2.09	0.26	0.08	0.02	0.73	0.40	1.18	0.34	2.24	12.21	12.07	24.53
45	5.18	2.33	0.27	0.08	0.03	0.76	0.42	1.27	0.36	2.40	13.09	12.94	26.28
50	5.54	2.64	0.27	0.08	0.03	0.79	0.43	1.36	0.39	2.58	14.11	13.93	28.30

Table VOC BUS 6
Economic Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.15	1.19	0.29	0.09	0.02	0.58	0.32	0.80	0.23	1.52	8.19	8.19	16.57
5	3.33	1.26	0.29	0.09	0.02	0.61	0.33	0.84	0.24	1.59	8.60	8.58	17.38
10	3.52	1.35	0.29	0.09	0.02	0.63	0.35	0.88	0.25	1.67	9.04	9.00	18.26
15	3.72	1.44	0.29	0.09	0.02	0.65	0.36	0.93	0.27	1.76	9.53	9.48	19.22
20	3.94	1.55	0.29	0.09	0.02	0.68	0.37	0.98	0.28	1.85	10.06	10.00	20.29
25	4.18	1.68	0.29	0.09	0.02	0.70	0.39	1.04	0.30	1.96	10.66	10.58	21.48
30	4.44	1.84	0.29	0.09	0.02	0.73	0.40	1.10	0.31	2.08	11.32	11.24	22.80
35	4.73	2.02	0.29	0.09	0.02	0.76	0.42	1.17	0.34	2.22	12.06	11.99	24.30
40	5.04	2.25	0.30	0.09	0.02	0.78	0.43	1.26	0.36	2.38	12.91	12.84	26.01
45	5.39	2.53	0.30	0.09	0.03	0.81	0.45	1.35	0.39	2.56	13.90	13.82	27.99
50	5.79	2.90	0.30	0.09	0.03	0.84	0.46	1.46	0.42	2.77	15.07	14.96	30.31

Table VOC BUS 7
Economic Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.20	1.24	0.32	0.10	0.02	0.63	0.35	0.84	0.24	1.58	8.51	8.53	17.25
5	3.39	1.32	0.32	0.10	0.02	0.65	0.36	0.88	0.25	1.66	8.95	8.96	18.12
10	3.60	1.41	0.32	0.10	0.02	0.68	0.37	0.92	0.26	1.75	9.43	9.42	19.08
15	3.82	1.52	0.32	0.10	0.02	0.70	0.39	0.97	0.28	1.84	9.96	9.94	20.13
20	4.05	1.64	0.32	0.10	0.02	0.73	0.40	1.03	0.29	1.95	10.54	10.52	21.30
25	4.31	1.79	0.32	0.10	0.02	0.76	0.42	1.09	0.31	2.07	11.19	11.17	22.61
30	4.59	1.96	0.33	0.10	0.02	0.78	0.43	1.16	0.33	2.20	11.92	11.90	24.08
35	4.90	2.17	0.33	0.10	0.02	0.81	0.45	1.25	0.36	2.36	12.75	12.74	25.76
40	5.25	2.43	0.33	0.10	0.02	0.84	0.46	1.34	0.38	2.54	13.71	13.71	27.70
45	5.64	2.77	0.33	0.10	0.03	0.88	0.48	1.45	0.41	2.75	14.84	14.83	29.96
50	6.09	3.21	0.33	0.10	0.03	0.91	0.50	1.58	0.45	2.99	16.20	16.15	32.65

Table VOC BUS 8
Economic Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.27	1.29	0.35	0.11	0.02	0.68	0.37	0.87	0.25	1.65	8.86	8.91	17.99
5	3.47	1.38	0.35	0.11	0.02	0.70	0.39	0.92	0.26	1.74	9.33	9.37	18.94
10	3.69	1.48	0.35	0.11	0.02	0.73	0.40	0.97	0.28	1.83	9.85	9.88	19.98
15	3.92	1.60	0.35	0.11	0.02	0.75	0.41	1.02	0.29	1.94	10.43	10.45	21.13
20	4.18	1.74	0.35	0.11	0.02	0.78	0.43	1.09	0.31	2.05	11.06	11.09	22.42
25	4.45	1.90	0.36	0.11	0.02	0.81	0.45	1.16	0.33	2.19	11.78	11.82	23.87
30	4.76	2.10	0.36	0.11	0.02	0.84	0.46	1.24	0.35	2.34	12.59	12.64	25.52
35	5.10	2.34	0.36	0.11	0.02	0.87	0.48	1.33	0.38	2.52	13.53	13.59	27.41
40	5.49	2.65	0.36	0.11	0.02	0.91	0.50	1.44	0.41	2.72	14.62	14.70	29.62
45	5.93	3.06	0.36	0.11	0.03	0.94	0.52	1.57	0.45	2.96	15.93	16.00	32.24
50	6.45	3.61	0.36	0.11	0.03	0.98	0.54	1.72	0.49	3.25	17.53	17.55	35.41

Table VOC BUS 9
Economic Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.34	1.35	0.38	0.12	0.02	0.73	0.40	0.91	0.26	1.73	9.24	9.32	18.80
5	3.56	1.45	0.38	0.12	0.02	0.75	0.41	0.96	0.27	1.82	9.75	9.82	19.83
10	3.79	1.56	0.38	0.12	0.02	0.78	0.43	1.02	0.29	1.92	10.32	10.39	20.97
15	4.04	1.69	0.39	0.12	0.02	0.81	0.45	1.08	0.31	2.04	10.94	11.02	22.24
20	4.32	1.84	0.39	0.12	0.02	0.84	0.46	1.15	0.33	2.17	11.65	11.74	23.66
25	4.62	2.03	0.39	0.12	0.02	0.87	0.48	1.23	0.35	2.32	12.44	12.55	25.28
30	4.96	2.26	0.39	0.12	0.02	0.91	0.50	1.32	0.38	2.50	13.35	13.49	27.14
35	5.34	2.54	0.39	0.12	0.02	0.94	0.52	1.43	0.41	2.70	14.41	14.57	29.30
40	5.78	2.91	0.39	0.12	0.02	0.97	0.54	1.55	0.44	2.94	15.67	15.85	31.85
45	6.29	3.41	0.39	0.12	0.03	1.01	0.56	1.70	0.49	3.22	17.21	17.37	34.91
50	6.89	4.10	0.39	0.12	0.03	1.05	0.58	1.88	0.54	3.56	19.14	19.21	38.71

Table VOC BUS 10
Economic Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 11000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.43	1.41	0.41	0.13	0.02	0.78	0.43	0.96	0.27	1.81	9.65	9.77	19.68
5	3.66	1.52	0.41	0.13	0.02	0.81	0.45	1.01	0.29	1.91	10.21	10.32	20.81
10	3.91	1.64	0.42	0.13	0.02	0.84	0.46	1.07	0.31	2.03	10.83	10.95	22.06
15	4.18	1.79	0.42	0.13	0.02	0.87	0.48	1.14	0.33	2.16	11.52	11.65	23.47
20	4.48	1.97	0.42	0.13	0.02	0.90	0.50	1.22	0.35	2.31	12.30	12.46	25.06
25	4.82	2.18	0.42	0.13	0.02	0.94	0.52	1.31	0.37	2.48	13.19	13.38	26.88
30	5.20	2.44	0.42	0.13	0.02	0.97	0.54	1.41	0.40	2.68	14.22	14.45	28.99
35	5.63	2.78	0.42	0.13	0.02	1.01	0.56	1.54	0.44	2.91	15.44	15.70	31.47
40	6.12	3.23	0.42	0.13	0.02	1.05	0.58	1.68	0.48	3.18	16.91	17.19	34.45
45	6.72	3.85	0.42	0.13	0.03	1.09	0.60	1.86	0.53	3.52	18.74	19.00	38.10
50	7.44	4.76	0.43	0.13	0.03	1.13	0.62	2.08	0.59	3.93	21.13	21.22	42.74

Table VOC BUS 11
Economic Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 12000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.53	1.48	0.45	0.14	0.02	0.84	0.46	1.00	0.29	1.90	10.11	10.26	20.65
5	3.78	1.60	0.45	0.14	0.02	0.87	0.48	1.06	0.30	2.01	10.72	10.88	21.89
10	4.05	1.74	0.45	0.14	0.02	0.90	0.50	1.13	0.32	2.14	11.40	11.57	23.27
15	4.35	1.91	0.45	0.14	0.02	0.94	0.52	1.21	0.35	2.29	12.16	12.37	24.84
20	4.68	2.11	0.45	0.14	0.02	0.97	0.53	1.30	0.37	2.46	13.03	13.27	26.63
25	5.05	2.35	0.45	0.14	0.02	1.01	0.55	1.40	0.40	2.65	14.03	14.32	28.70
30	5.47	2.66	0.45	0.14	0.02	1.05	0.58	1.52	0.44	2.88	15.21	15.55	31.12
35	5.96	3.07	0.45	0.14	0.02	1.09	0.60	1.67	0.48	3.15	16.63	17.02	34.01
40	6.54	3.63	0.45	0.14	0.02	1.13	0.62	1.84	0.53	3.48	18.38	18.78	37.54
45	7.25	4.43	0.46	0.14	0.03	1.17	0.64	2.05	0.59	3.88	20.63	20.96	41.98
50	8.13	5.68	0.46	0.14	0.03	1.21	0.67	2.32	0.66	4.39	23.68	23.71	47.80

Table VOC BUS 12
Economic Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 13000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.65	1.56	0.48	0.15	0.02	0.90	0.50	1.06	0.30	2.00	10.61	10.81	21.72
5	3.91	1.69	0.48	0.15	0.02	0.94	0.51	1.12	0.32	2.13	11.28	11.50	23.09
10	4.21	1.85	0.48	0.15	0.02	0.97	0.53	1.20	0.34	2.27	12.03	12.28	24.63
15	4.54	2.04	0.48	0.15	0.02	1.01	0.55	1.29	0.37	2.44	12.88	13.17	26.39
20	4.90	2.27	0.48	0.15	0.02	1.04	0.57	1.39	0.40	2.63	13.86	14.20	28.41
25	5.32	2.56	0.48	0.15	0.02	1.08	0.60	1.51	0.43	2.85	15.01	15.41	30.78
30	5.80	2.93	0.48	0.15	0.02	1.12	0.62	1.65	0.47	3.12	16.37	16.85	33.60
35	6.37	3.43	0.49	0.15	0.02	1.17	0.64	1.82	0.52	3.44	18.05	18.58	37.01
40	7.06	4.13	0.49	0.15	0.02	1.21	0.67	2.03	0.58	3.83	20.17	20.70	41.28
45	7.92	5.20	0.49	0.15	0.03	1.26	0.69	2.29	0.65	4.33	23.01	23.38	46.80
50	9.04	7.02	0.49	0.15	0.03	1.30	0.72	2.63	0.75	4.97	27.10	26.84	54.38

Table VOC BUS 13
Economic Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 14000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.78	1.65	0.51	0.16	0.02	0.97	0.53	1.12	0.32	2.11	11.17	11.42	22.91
5	4.07	1.80	0.51	0.16	0.02	1.01	0.55	1.19	0.34	2.26	11.91	12.19	24.43
10	4.39	1.97	0.51	0.16	0.02	1.04	0.57	1.28	0.37	2.42	12.74	13.07	26.16
15	4.76	2.19	0.51	0.16	0.02	1.08	0.60	1.38	0.39	2.61	13.70	14.08	28.14
20	5.17	2.45	0.51	0.16	0.02	1.12	0.62	1.49	0.43	2.83	14.81	15.27	30.46
25	5.64	2.80	0.51	0.16	0.02	1.17	0.64	1.63	0.47	3.09	16.13	16.68	33.20
30	6.20	3.25	0.52	0.16	0.02	1.21	0.66	1.80	0.51	3.40	17.74	18.37	36.52
35	6.87	3.88	0.52	0.16	0.02	1.25	0.69	2.00	0.57	3.79	19.76	20.45	40.63
40	7.71	4.80	0.52	0.16	0.02	1.30	0.72	2.26	0.65	4.27	22.41	23.06	45.90
45	8.80	6.31	0.52	0.16	0.03	1.35	0.74	2.59	0.74	4.89	26.13	26.42	53.00
50	10.28	9.20	0.52	0.16	0.03	1.40	0.77	3.03	0.87	5.73	31.99	30.94	63.40

Table VOC BUS 14
Economic Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 15000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.93	1.75	0.54	0.17	0.02	1.04	0.57	1.18	0.34	2.24	11.79	12.10	24.23
5	4.25	1.91	0.54	0.17	0.02	1.08	0.59	1.27	0.36	2.40	12.60	12.97	25.93
10	4.61	2.11	0.54	0.17	0.02	1.12	0.62	1.37	0.39	2.59	13.54	13.97	27.88
15	5.02	2.36	0.54	0.17	0.02	1.16	0.64	1.48	0.42	2.80	14.62	15.13	30.15
20	5.48	2.68	0.55	0.17	0.02	1.21	0.66	1.62	0.46	3.06	15.91	16.52	32.83
25	6.03	3.09	0.55	0.17	0.02	1.25	0.69	1.78	0.51	3.37	17.45	18.17	36.05
30	6.69	3.65	0.55	0.17	0.02	1.30	0.71	1.98	0.57	3.74	19.38	20.20	40.02
35	7.51	4.46	0.55	0.17	0.02	1.35	0.74	2.23	0.64	4.21	21.87	22.74	45.07
40	8.56	5.73	0.55	0.17	0.02	1.40	0.77	2.55	0.73	4.82	25.30	26.01	51.78
45	9.99	8.02	0.55	0.17	0.03	1.45	0.80	2.97	0.85	5.63	30.46	30.38	61.33
50	12.09	13.34	0.55	0.17	0.03	1.51	0.83	3.57	1.02	6.76	39.87	36.51	76.89

Table VOC BUS 15
Economic Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.04	0.95	0.11	0.04	0.01	0.35	0.19	0.60	0.17	1.14	6.59	6.14	12.85
5	3.16	0.99	0.11	0.04	0.02	0.36	0.20	0.62	0.18	1.18	6.85	6.37	13.35
10	3.28	1.05	0.11	0.04	0.02	0.37	0.20	0.65	0.19	1.23	7.13	6.63	13.88
15	3.41	1.10	0.11	0.04	0.02	0.39	0.21	0.68	0.19	1.28	7.43	6.90	14.46
20	3.55	1.17	0.11	0.04	0.02	0.40	0.22	0.70	0.20	1.33	7.75	7.20	15.09
25	3.70	1.24	0.11	0.04	0.02	0.42	0.23	0.74	0.21	1.39	8.10	7.53	15.77
30	3.86	1.32	0.11	0.04	0.02	0.43	0.24	0.77	0.22	1.46	8.48	7.89	16.51
35	4.04	1.41	0.12	0.04	0.02	0.45	0.25	0.81	0.23	1.53	8.90	8.28	17.33
40	4.22	1.52	0.12	0.04	0.02	0.46	0.26	0.85	0.24	1.61	9.35	8.72	18.23
45	4.42	1.65	0.12	0.04	0.02	0.48	0.26	0.90	0.26	1.70	9.86	9.20	19.22
50	4.64	1.79	0.12	0.04	0.02	0.50	0.27	0.95	0.27	1.80	10.42	9.74	20.33

Table VOC BUS 16
Economic Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.04	0.98	0.13	0.05	0.01	0.37	0.20	0.61	0.18	1.16	6.74	6.28	13.15
5	3.17	1.03	0.13	0.05	0.02	0.39	0.21	0.64	0.18	1.21	7.02	6.53	13.67
10	3.29	1.08	0.13	0.05	0.02	0.40	0.22	0.66	0.19	1.26	7.31	6.79	14.24
15	3.43	1.15	0.13	0.05	0.02	0.42	0.23	0.69	0.20	1.31	7.62	7.08	14.85
20	3.58	1.22	0.13	0.05	0.02	0.43	0.24	0.72	0.21	1.37	7.96	7.40	15.51
25	3.74	1.29	0.14	0.05	0.02	0.45	0.25	0.76	0.22	1.43	8.33	7.75	16.23
30	3.90	1.38	0.14	0.05	0.02	0.46	0.25	0.79	0.23	1.50	8.74	8.12	17.02
35	4.08	1.49	0.14	0.05	0.02	0.48	0.26	0.84	0.24	1.58	9.18	8.54	17.88
40	4.28	1.60	0.14	0.05	0.02	0.50	0.27	0.88	0.25	1.67	9.67	9.01	18.84
45	4.49	1.74	0.14	0.05	0.02	0.52	0.28	0.93	0.27	1.76	10.21	9.52	19.90
50	4.72	1.91	0.14	0.05	0.02	0.54	0.30	0.99	0.28	1.87	10.82	10.10	21.10

Table VOC BUS 17
Economic Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.05	1.01	0.15	0.06	0.01	0.40	0.22	0.63	0.18	1.19	6.91	6.43	13.47
5	3.18	1.07	0.15	0.06	0.02	0.41	0.23	0.65	0.19	1.24	7.19	6.69	14.02
10	3.31	1.13	0.15	0.06	0.02	0.43	0.24	0.68	0.19	1.29	7.50	6.97	14.61
15	3.46	1.19	0.15	0.06	0.02	0.45	0.25	0.71	0.20	1.35	7.83	7.27	15.25
20	3.61	1.27	0.16	0.06	0.02	0.46	0.25	0.74	0.21	1.41	8.19	7.61	15.95
25	3.77	1.35	0.16	0.06	0.02	0.48	0.26	0.78	0.22	1.48	8.58	7.97	16.72
30	3.95	1.45	0.16	0.06	0.02	0.50	0.27	0.82	0.23	1.55	9.01	8.37	17.55
35	4.14	1.56	0.16	0.06	0.02	0.52	0.28	0.86	0.25	1.63	9.48	8.82	18.48
40	4.34	1.70	0.16	0.06	0.02	0.54	0.29	0.91	0.26	1.73	10.01	9.31	19.50
45	4.56	1.85	0.16	0.06	0.02	0.56	0.31	0.97	0.28	1.83	10.59	9.87	20.64
50	4.81	2.04	0.16	0.06	0.02	0.58	0.32	1.03	0.29	1.94	11.25	10.49	21.94

Table VOC BUS 18
Economic Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.07	1.05	0.17	0.07	0.01	0.43	0.24	0.64	0.18	1.22	7.08	6.58	13.81
5	3.20	1.11	0.17	0.07	0.02	0.45	0.24	0.67	0.19	1.27	7.38	6.86	14.39
10	3.34	1.17	0.18	0.07	0.02	0.46	0.25	0.70	0.20	1.32	7.70	7.15	15.01
15	3.48	1.24	0.18	0.07	0.02	0.48	0.26	0.73	0.21	1.38	8.05	7.47	15.69
20	3.64	1.32	0.18	0.07	0.02	0.50	0.27	0.77	0.22	1.45	8.44	7.83	16.43
25	3.81	1.42	0.18	0.07	0.02	0.52	0.28	0.80	0.23	1.52	8.85	8.21	17.24
30	4.00	1.53	0.18	0.07	0.02	0.54	0.29	0.85	0.24	1.60	9.31	8.64	18.13
35	4.20	1.65	0.18	0.07	0.02	0.56	0.31	0.89	0.26	1.69	9.81	9.11	19.11
40	4.41	1.80	0.18	0.07	0.02	0.58	0.32	0.94	0.27	1.79	10.37	9.64	20.21
45	4.65	1.98	0.18	0.07	0.02	0.60	0.33	1.00	0.29	1.90	11.01	10.24	21.45
50	4.90	2.19	0.18	0.07	0.02	0.62	0.34	1.07	0.31	2.02	11.73	10.91	22.85

Table VOC BUS 19
Economic Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.08	1.09	0.19	0.08	0.01	0.46	0.25	0.66	0.19	1.25	7.27	6.75	14.17
5	3.22	1.15	0.20	0.08	0.02	0.48	0.26	0.69	0.20	1.30	7.58	7.03	14.78
10	3.36	1.22	0.20	0.08	0.02	0.50	0.27	0.72	0.21	1.36	7.92	7.34	15.43
15	3.52	1.30	0.20	0.08	0.02	0.52	0.28	0.75	0.22	1.42	8.29	7.68	16.15
20	3.68	1.39	0.20	0.08	0.02	0.54	0.29	0.79	0.23	1.49	8.70	8.06	16.93
25	3.86	1.49	0.20	0.08	0.02	0.56	0.31	0.83	0.24	1.57	9.14	8.47	17.79
30	4.05	1.61	0.20	0.08	0.02	0.58	0.32	0.87	0.25	1.65	9.63	8.92	18.74
35	4.26	1.75	0.20	0.08	0.02	0.60	0.33	0.92	0.26	1.75	10.17	9.43	19.80
40	4.49	1.92	0.20	0.08	0.02	0.62	0.34	0.98	0.28	1.85	10.78	10.00	20.98
45	4.73	2.12	0.20	0.08	0.02	0.64	0.35	1.04	0.30	1.97	11.46	10.64	22.32
50	5.01	2.37	0.21	0.08	0.02	0.67	0.37	1.11	0.32	2.11	12.25	11.37	23.84

Table VOC BUS 20
Economic Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.10	1.13	0.22	0.09	0.01	0.50	0.27	0.68	0.19	1.28	7.46	6.92	14.55
5	3.24	1.19	0.22	0.09	0.02	0.51	0.28	0.71	0.20	1.34	7.80	7.22	15.19
10	3.39	1.27	0.22	0.09	0.02	0.53	0.29	0.74	0.21	1.40	8.16	7.55	15.88
15	3.55	1.36	0.22	0.09	0.02	0.55	0.30	0.77	0.22	1.46	8.55	7.91	16.64
20	3.72	1.45	0.22	0.09	0.02	0.58	0.32	0.81	0.23	1.54	8.98	8.30	17.47
25	3.91	1.57	0.22	0.09	0.02	0.60	0.33	0.86	0.24	1.62	9.45	8.74	18.39
30	4.11	1.70	0.22	0.09	0.02	0.62	0.34	0.90	0.26	1.71	9.97	9.23	19.41
35	4.33	1.86	0.22	0.09	0.02	0.64	0.35	0.96	0.27	1.81	10.56	9.77	20.54
40	4.57	2.05	0.23	0.09	0.02	0.67	0.37	1.02	0.29	1.92	11.21	10.38	21.82
45	4.83	2.28	0.23	0.09	0.02	0.69	0.38	1.08	0.31	2.05	11.97	11.07	23.27
50	5.13	2.57	0.23	0.09	0.02	0.72	0.39	1.16	0.33	2.20	12.84	11.86	24.94

Table VOC BUS 21
Economic Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.12	1.17	0.24	0.09	0.01	0.53	0.29	0.69	0.20	1.32	7.67	7.10	14.95
5	3.27	1.25	0.24	0.10	0.02	0.55	0.30	0.73	0.21	1.37	8.02	7.42	15.63
10	3.42	1.33	0.24	0.10	0.02	0.57	0.32	0.76	0.22	1.44	8.41	7.76	16.36
15	3.59	1.42	0.24	0.10	0.02	0.60	0.33	0.80	0.23	1.51	8.82	8.14	17.17
20	3.77	1.53	0.24	0.10	0.02	0.62	0.34	0.84	0.24	1.59	9.28	8.57	18.05
25	3.97	1.66	0.24	0.10	0.02	0.64	0.35	0.88	0.25	1.67	9.79	9.03	19.03
30	4.18	1.80	0.24	0.10	0.02	0.67	0.37	0.93	0.27	1.77	10.35	9.55	20.12
35	4.41	1.98	0.25	0.10	0.02	0.69	0.38	0.99	0.28	1.88	10.98	10.13	21.34
40	4.66	2.20	0.25	0.10	0.02	0.72	0.39	1.06	0.30	2.00	11.70	10.79	22.73
45	4.94	2.47	0.25	0.10	0.02	0.74	0.41	1.13	0.32	2.14	12.52	11.54	24.32
50	5.26	2.82	0.25	0.10	0.02	0.77	0.42	1.21	0.35	2.30	13.49	12.41	26.16

Table VOC BUS 22
Economic Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.14	1.22	0.26	0.10	0.01	0.57	0.32	0.71	0.20	1.35	7.90	7.29	15.38
5	3.30	1.30	0.26	0.10	0.02	0.60	0.33	0.75	0.21	1.41	8.27	7.62	16.09
10	3.46	1.39	0.26	0.10	0.02	0.62	0.34	0.78	0.22	1.48	8.68	7.99	16.87
15	3.64	1.49	0.26	0.11	0.02	0.64	0.35	0.82	0.23	1.56	9.12	8.40	17.73
20	3.83	1.61	0.26	0.11	0.02	0.66	0.37	0.87	0.25	1.64	9.61	8.84	18.67
25	4.03	1.75	0.27	0.11	0.02	0.69	0.38	0.91	0.26	1.73	10.15	9.34	19.72
30	4.25	1.92	0.27	0.11	0.02	0.72	0.39	0.97	0.28	1.83	10.75	9.90	20.89
35	4.50	2.12	0.27	0.11	0.02	0.74	0.41	1.03	0.29	1.95	11.44	10.53	22.22
40	4.77	2.38	0.27	0.11	0.02	0.77	0.42	1.10	0.31	2.08	12.23	11.24	23.72
45	5.07	2.69	0.27	0.11	0.02	0.80	0.44	1.18	0.34	2.23	13.15	12.05	25.47
50	5.40	3.11	0.27	0.11	0.02	0.83	0.46	1.27	0.36	2.41	14.24	13.00	27.52

Table VOC BUS 23
Economic Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.17	1.27	0.28	0.11	0.01	0.62	0.34	0.73	0.21	1.39	8.14	7.49	15.84
5	3.33	1.36	0.28	0.11	0.02	0.64	0.35	0.77	0.22	1.45	8.53	7.84	16.59
10	3.50	1.46	0.28	0.11	0.02	0.66	0.36	0.81	0.23	1.53	8.96	8.23	17.42
15	3.69	1.57	0.28	0.11	0.02	0.69	0.38	0.85	0.24	1.60	9.44	8.66	18.33
20	3.88	1.71	0.29	0.11	0.02	0.71	0.39	0.89	0.26	1.69	9.96	9.14	19.34
25	4.10	1.86	0.29	0.12	0.02	0.74	0.41	0.95	0.27	1.79	10.54	9.67	20.46
30	4.34	2.05	0.29	0.12	0.02	0.77	0.42	1.01	0.29	1.90	11.20	10.27	21.73
35	4.59	2.29	0.29	0.12	0.02	0.80	0.44	1.07	0.31	2.03	11.95	10.95	23.17
40	4.88	2.58	0.29	0.12	0.02	0.83	0.46	1.15	0.33	2.17	12.82	11.72	24.82
45	5.20	2.96	0.29	0.12	0.02	0.86	0.47	1.23	0.35	2.34	13.85	12.61	26.75
50	5.56	3.48	0.29	0.12	0.02	0.89	0.49	1.34	0.38	2.53	15.10	13.65	29.05

Table VOC BUS 24
Economic Cost of Operation of Buses on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.06	0.91	0.10	0.03	0.01	0.32	0.18	0.58	0.17	1.10	6.47	16.57	23.15
5	3.17	0.96	0.10	0.03	0.01	0.33	0.18	0.61	0.17	1.15	6.72	17.20	24.03
10	3.29	1.01	0.10	0.03	0.01	0.35	0.19	0.63	0.18	1.19	6.98	17.88	24.98
15	3.42	1.06	0.10	0.03	0.01	0.36	0.20	0.66	0.19	1.24	7.27	18.62	26.01
20	3.55	1.12	0.10	0.03	0.02	0.37	0.20	0.68	0.20	1.29	7.57	19.42	27.12
25	3.70	1.18	0.10	0.03	0.02	0.39	0.21	0.71	0.20	1.35	7.90	20.29	28.32
30	3.85	1.26	0.11	0.03	0.02	0.40	0.22	0.75	0.21	1.42	8.26	21.25	29.64
35	4.02	1.34	0.11	0.03	0.02	0.42	0.23	0.79	0.22	1.49	8.65	22.29	31.09
40	4.19	1.44	0.11	0.03	0.02	0.43	0.24	0.83	0.24	1.56	9.08	23.45	32.68
45	4.39	1.55	0.11	0.03	0.02	0.45	0.25	0.87	0.25	1.65	9.56	24.73	34.44
50	4.59	1.68	0.11	0.03	0.02	0.46	0.25	0.92	0.26	1.74	10.09	26.16	36.40

Table VOC BUS 25
Economic Cost of Operation of Buses on Two Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.07	0.94	0.12	0.04	0.01	0.34	0.19	0.59	0.17	1.12	6.61	16.87	23.59
5	3.18	0.99	0.12	0.04	0.01	0.36	0.20	0.62	0.18	1.17	6.86	17.52	24.50
10	3.31	1.04	0.12	0.04	0.01	0.37	0.20	0.64	0.18	1.22	7.14	18.23	25.49
15	3.43	1.10	0.12	0.04	0.01	0.39	0.21	0.67	0.19	1.27	7.43	18.99	26.56
20	3.57	1.16	0.12	0.04	0.02	0.40	0.22	0.70	0.20	1.32	7.75	19.83	27.71
25	3.72	1.23	0.12	0.04	0.02	0.41	0.23	0.73	0.21	1.38	8.10	20.74	28.98
30	3.88	1.31	0.12	0.04	0.02	0.43	0.24	0.77	0.22	1.45	8.48	21.73	30.35
35	4.05	1.41	0.12	0.04	0.02	0.45	0.25	0.80	0.23	1.52	8.89	22.83	31.87
40	4.24	1.51	0.12	0.04	0.02	0.46	0.25	0.85	0.24	1.60	9.35	24.04	33.54
45	4.44	1.64	0.13	0.04	0.02	0.48	0.26	0.89	0.26	1.69	9.85	25.39	35.40
50	4.66	1.78	0.13	0.04	0.02	0.50	0.27	0.95	0.27	1.79	10.41	26.91	37.48

Table VOC BUS 26
Economic Cost of Operation of Buses on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.08	0.98	0.13	0.05	0.01	0.37	0.20	0.60	0.17	1.14	6.75	17.17	24.04
5	3.20	1.02	0.13	0.05	0.01	0.38	0.21	0.63	0.18	1.19	7.01	17.85	24.99
10	3.32	1.08	0.14	0.05	0.01	0.40	0.22	0.65	0.19	1.24	7.30	18.59	26.02
15	3.45	1.14	0.14	0.05	0.01	0.41	0.23	0.68	0.20	1.29	7.61	19.38	27.13
20	3.60	1.21	0.14	0.05	0.02	0.43	0.24	0.71	0.20	1.35	7.94	20.25	28.34
25	3.75	1.29	0.14	0.05	0.02	0.45	0.25	0.75	0.21	1.41	8.31	21.20	29.66
30	3.92	1.38	0.14	0.05	0.02	0.46	0.25	0.78	0.22	1.48	8.71	22.24	31.10
35	4.09	1.48	0.14	0.05	0.02	0.48	0.26	0.82	0.24	1.56	9.14	23.39	32.70
40	4.29	1.59	0.14	0.05	0.02	0.50	0.27	0.87	0.25	1.64	9.63	24.67	34.46
45	4.49	1.73	0.14	0.05	0.02	0.52	0.28	0.92	0.26	1.74	10.16	26.09	36.43
50	4.72	1.89	0.14	0.05	0.02	0.54	0.29	0.98	0.28	1.85	10.76	27.69	38.63

Table VOC BUS 27
Economic Cost of Operation of Buses on Two Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.09	1.01	0.15	0.06	0.01	0.40	0.22	0.62	0.18	1.17	6.89	17.49	24.52
5	3.21	1.06	0.15	0.06	0.01	0.41	0.23	0.64	0.18	1.21	7.17	18.19	25.50
10	3.34	1.12	0.15	0.06	0.01	0.43	0.24	0.67	0.19	1.26	7.47	18.96	26.57
15	3.48	1.19	0.15	0.06	0.01	0.45	0.24	0.70	0.20	1.32	7.80	19.79	27.73
20	3.62	1.26	0.15	0.06	0.02	0.46	0.25	0.73	0.21	1.38	8.15	20.69	29.00
25	3.78	1.35	0.16	0.06	0.02	0.48	0.26	0.76	0.22	1.45	8.53	21.68	30.38
30	3.95	1.44	0.16	0.06	0.02	0.50	0.27	0.80	0.23	1.52	8.95	22.78	31.89
35	4.14	1.55	0.16	0.06	0.02	0.52	0.28	0.84	0.24	1.60	9.41	23.98	33.57
40	4.34	1.68	0.16	0.06	0.02	0.54	0.29	0.89	0.26	1.69	9.93	25.33	35.43
45	4.55	1.84	0.16	0.06	0.02	0.56	0.31	0.94	0.27	1.79	10.50	26.83	37.52
50	4.79	2.02	0.16	0.06	0.02	0.58	0.32	1.00	0.29	1.90	11.14	28.52	39.86

Table VOC BUS 28
Economic Cost of Operation of Buses on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.10	1.04	0.17	0.07	0.01	0.43	0.24	0.63	0.18	1.19	7.05	17.82	25.01
5	3.22	1.10	0.17	0.07	0.01	0.44	0.24	0.65	0.19	1.24	7.34	18.55	26.04
10	3.36	1.16	0.17	0.07	0.01	0.46	0.25	0.68	0.19	1.29	7.66	19.34	27.15
15	3.50	1.24	0.17	0.07	0.01	0.48	0.26	0.71	0.20	1.35	8.00	20.21	28.36
20	3.65	1.32	0.17	0.07	0.02	0.50	0.27	0.75	0.21	1.41	8.37	21.15	29.69
25	3.82	1.41	0.17	0.07	0.02	0.51	0.28	0.78	0.22	1.48	8.77	22.19	31.13
30	3.99	1.52	0.17	0.07	0.02	0.53	0.29	0.82	0.24	1.56	9.21	23.34	32.73
35	4.19	1.64	0.17	0.07	0.02	0.55	0.30	0.87	0.25	1.64	9.70	24.61	34.50
40	4.39	1.79	0.18	0.07	0.02	0.58	0.32	0.92	0.26	1.73	10.25	26.02	36.47
45	4.62	1.96	0.18	0.07	0.02	0.60	0.33	0.97	0.28	1.84	10.86	27.61	38.68
50	4.87	2.17	0.18	0.07	0.02	0.62	0.34	1.04	0.30	1.96	11.56	29.41	41.18

Table VOC BUS 29
Economic Cost of Operation of Buses on Two Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.11	1.08	0.18	0.08	0.01	0.46	0.25	0.64	0.18	1.21	7.22	18.16	25.53
5	3.24	1.14	0.18	0.08	0.01	0.48	0.26	0.67	0.19	1.26	7.52	18.92	26.60
10	3.38	1.21	0.19	0.08	0.01	0.50	0.27	0.70	0.20	1.32	7.85	19.75	27.76
15	3.53	1.29	0.19	0.08	0.01	0.51	0.28	0.73	0.21	1.38	8.21	20.65	29.03
20	3.68	1.38	0.19	0.08	0.02	0.53	0.29	0.76	0.22	1.44	8.60	21.64	30.41
25	3.85	1.48	0.19	0.08	0.02	0.55	0.30	0.80	0.23	1.51	9.02	22.72	31.93
30	4.04	1.60	0.19	0.08	0.02	0.57	0.32	0.84	0.24	1.60	9.49	23.93	33.61
35	4.24	1.74	0.19	0.08	0.02	0.60	0.33	0.89	0.25	1.68	10.02	25.26	35.48
40	4.45	1.90	0.19	0.08	0.02	0.62	0.34	0.94	0.27	1.78	10.60	26.76	37.56
45	4.69	2.10	0.19	0.08	0.02	0.64	0.35	1.00	0.29	1.90	11.26	28.44	39.92
50	4.95	2.34	0.20	0.08	0.02	0.67	0.37	1.07	0.31	2.02	12.02	30.35	42.59

Table VOC BUS 30
Economic Cost of Operation of Buses on Two Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.13	1.12	0.20	0.09	0.01	0.49	0.27	0.65	0.19	1.23	7.39	18.52	26.07
5	3.26	1.19	0.20	0.09	0.01	0.51	0.28	0.68	0.19	1.29	7.71	19.31	27.19
10	3.40	1.26	0.20	0.09	0.01	0.53	0.29	0.71	0.20	1.34	8.06	20.17	28.40
15	3.55	1.35	0.20	0.09	0.01	0.55	0.30	0.74	0.21	1.41	8.43	21.11	29.73
20	3.72	1.45	0.21	0.09	0.02	0.57	0.32	0.78	0.22	1.48	8.84	22.14	31.18
25	3.89	1.56	0.21	0.09	0.02	0.60	0.33	0.82	0.23	1.55	9.29	23.28	32.78
30	4.09	1.69	0.21	0.09	0.02	0.62	0.34	0.86	0.25	1.64	9.79	24.54	34.55
35	4.29	1.84	0.21	0.09	0.02	0.64	0.35	0.91	0.26	1.73	10.35	25.95	36.52
40	4.52	2.03	0.21	0.09	0.02	0.66	0.37	0.97	0.28	1.84	10.98	27.53	38.74
45	4.76	2.26	0.21	0.09	0.02	0.69	0.38	1.03	0.30	1.95	11.70	29.32	41.25
50	5.04	2.55	0.21	0.09	0.02	0.72	0.39	1.10	0.32	2.09	12.52	31.35	44.12

Table VOC BUS 31
Economic Cost of Operation of Buses on Two Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.14	1.17	0.22	0.10	0.01	0.53	0.29	0.67	0.19	1.26	7.58	18.88	26.64
5	3.28	1.24	0.22	0.10	0.01	0.55	0.30	0.69	0.20	1.31	7.91	19.71	27.80
10	3.43	1.32	0.22	0.10	0.01	0.57	0.31	0.73	0.21	1.37	8.28	20.60	29.07
15	3.59	1.41	0.22	0.10	0.01	0.59	0.33	0.76	0.22	1.44	8.67	21.59	30.46
20	3.76	1.52	0.22	0.10	0.02	0.62	0.34	0.80	0.23	1.51	9.11	22.67	31.98
25	3.94	1.64	0.22	0.10	0.02	0.64	0.35	0.84	0.24	1.59	9.59	23.87	33.67
30	4.14	1.79	0.22	0.10	0.02	0.66	0.36	0.89	0.25	1.68	10.12	25.20	35.54
35	4.35	1.97	0.23	0.10	0.02	0.69	0.38	0.94	0.27	1.78	10.72	26.68	37.63
40	4.59	2.18	0.23	0.10	0.02	0.71	0.39	1.00	0.29	1.89	11.39	28.36	39.99
45	4.84	2.45	0.23	0.10	0.02	0.74	0.41	1.07	0.30	2.02	12.17	30.25	42.68
50	5.13	2.78	0.23	0.10	0.02	0.77	0.42	1.14	0.33	2.16	13.09	32.42	45.77

Table VOC BUS 32
Economic Cost of Operation of Buses on Two Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.16	1.21	0.23	0.11	0.01	0.57	0.31	0.68	0.19	1.28	7.78	19.27	27.24
5	3.30	1.29	0.24	0.11	0.01	0.59	0.33	0.71	0.20	1.34	8.13	20.12	28.45
10	3.46	1.38	0.24	0.11	0.01	0.62	0.34	0.74	0.21	1.40	8.51	21.06	29.78
15	3.62	1.48	0.24	0.11	0.01	0.64	0.35	0.78	0.22	1.47	8.93	22.09	31.23
20	3.80	1.60	0.24	0.11	0.02	0.66	0.36	0.82	0.23	1.55	9.39	23.23	32.84
25	3.99	1.74	0.24	0.11	0.02	0.69	0.38	0.86	0.25	1.63	9.90	24.48	34.61
30	4.19	1.91	0.24	0.11	0.02	0.71	0.39	0.91	0.26	1.73	10.47	25.88	36.59
35	4.41	2.11	0.24	0.11	0.02	0.74	0.41	0.97	0.28	1.83	11.11	27.46	38.82
40	4.66	2.35	0.24	0.11	0.02	0.77	0.42	1.03	0.29	1.95	11.85	29.23	41.34
45	4.93	2.67	0.24	0.11	0.02	0.80	0.44	1.10	0.31	2.08	12.71	31.25	44.22
50	5.23	3.07	0.25	0.11	0.02	0.83	0.45	1.18	0.34	2.24	13.72	33.57	47.57

Table VOC BUS 33
Economic Cost of Operation of Buses on Four Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.19	0.79	0.08	0.00	0.00	0.28	0.15	0.53	0.15	1.00	6.17	14.95	21.22
5	3.28	0.82	0.08	0.00	0.00	0.29	0.26	0.55	0.16	1.03	6.47	15.52	21.99
10	3.37	0.86	0.08	0.00	0.00	0.30	0.27	0.57	0.16	1.08	6.69	16.14	22.83
15	3.47	0.89	0.09	0.00	0.00	0.31	0.28	0.59	0.17	1.12	6.93	16.80	23.73
20	3.59	0.93	0.09	0.00	0.00	0.32	0.29	0.62	0.18	1.17	7.19	17.53	24.72
25	3.71	0.98	0.09	0.00	0.00	0.34	0.30	0.65	0.18	1.22	7.47	18.32	25.78
30	3.84	1.03	0.09	0.01	0.00	0.35	0.31	0.68	0.19	1.28	7.77	19.18	26.95
35	3.98	1.09	0.09	0.01	0.01	0.36	0.32	0.71	0.20	1.34	8.10	20.13	28.23
40	4.13	1.15	0.09	0.01	0.01	0.38	0.33	0.75	0.21	1.41	8.46	21.18	29.64
45	4.30	1.22	0.09	0.01	0.01	0.39	0.34	0.79	0.23	1.49	8.86	22.35	31.20
50	4.48	1.30	0.09	0.01	0.01	0.40	0.36	0.83	0.24	1.58	9.30	23.65	32.94

Table VOC BUS 34
Economic Cost of Operation of Buses on Four Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.19	0.81	0.09	0.01	0.00	0.30	0.17	0.54	0.15	1.01	6.27	15.22	21.59
5	3.28	0.84	0.09	0.01	0.00	0.31	0.17	0.56	0.16	1.05	6.48	15.81	22.39
10	3.37	0.88	0.09	0.01	0.00	0.32	0.18	0.58	0.17	1.10	6.71	16.45	23.26
15	3.48	0.92	0.09	0.01	0.00	0.34	0.18	0.60	0.17	1.14	6.95	17.14	24.21
20	3.60	0.97	0.09	0.01	0.00	0.35	0.19	0.63	0.18	1.19	7.22	17.90	25.23
25	3.72	1.01	0.10	0.01	0.00	0.36	0.20	0.66	0.19	1.25	7.50	18.72	26.35
30	3.86	1.07	0.10	0.01	0.00	0.37	0.21	0.69	0.20	1.31	7.82	19.62	27.57
35	4.00	1.13	0.10	0.01	0.01	0.39	0.21	0.73	0.21	1.37	8.16	20.62	28.91
40	4.16	1.19	0.10	0.02	0.01	0.40	0.22	0.77	0.22	1.45	8.54	21.72	30.39
45	4.34	1.27	0.10	0.02	0.01	0.42	0.23	0.81	0.23	1.53	8.95	22.95	32.04
50	4.53	1.36	0.10	0.02	0.01	0.43	0.24	0.86	0.24	1.62	9.41	24.32	33.88

Table VOC BUS 35
Economic Cost of Operation of Buses on Four Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.18	0.83	0.10	0.02	0.00	0.32	0.18	0.55	0.16	1.03	6.37	15.49	21.98
5	3.28	0.87	0.10	0.02	0.00	0.34	0.18	0.57	0.16	1.07	6.59	16.11	22.81
10	3.38	0.91	0.10	0.02	0.00	0.35	0.19	0.59	0.17	1.12	6.83	16.77	23.72
15	3.49	0.95	0.10	0.02	0.00	0.36	0.20	0.62	0.18	1.17	7.09	17.49	24.70
20	3.61	1.00	0.10	0.02	0.00	0.37	0.21	0.64	0.18	1.22	7.36	18.28	25.77
25	3.74	1.05	0.10	0.02	0.00	0.39	0.21	0.67	0.19	1.28	7.67	19.14	26.94
30	3.88	1.11	0.11	0.02	0.00	0.40	0.22	0.71	0.20	1.34	7.99	20.09	28.22
35	4.03	1.17	0.11	0.02	0.01	0.42	0.23	0.74	0.21	1.41	8.36	21.13	29.63
40	4.20	1.24	0.11	0.02	0.01	0.43	0.24	0.79	0.22	1.49	8.75	22.29	31.19
45	4.38	1.33	0.11	0.02	0.01	0.45	0.25	0.83	0.24	1.57	9.19	23.58	32.92
50	4.58	1.42	0.11	0.03	0.01	0.47	0.26	0.88	0.25	1.67	9.67	25.04	34.87

Table VOC BUS 36
Economic Cost of Operation of Buses on Four Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.18	0.86	0.11	0.03	0.00	0.35	0.19	0.56	0.16	1.05	6.48	15.78	22.38
5	3.28	0.89	0.11	0.03	0.00	0.36	0.20	0.58	0.17	1.09	6.71	16.42	23.25
10	3.38	0.94	0.11	0.03	0.00	0.37	0.21	0.60	0.17	1.14	6.96	17.11	24.19
15	3.50	0.98	0.11	0.03	0.00	0.39	0.21	0.63	0.18	1.19	7.23	17.86	25.22
20	3.62	1.03	0.11	0.03	0.00	0.40	0.22	0.66	0.19	1.25	7.52	18.68	26.34
25	3.76	1.09	0.11	0.03	0.00	0.42	0.23	0.69	0.20	1.31	7.84	19.58	27.56
30	3.91	1.15	0.11	0.03	0.00	0.43	0.24	0.72	0.21	1.37	8.18	20.57	28.90
35	4.07	1.22	0.12	0.03	0.01	0.45	0.25	0.76	0.22	1.44	8.56	21.67	30.38
40	4.24	1.30	0.12	0.03	0.01	0.47	0.26	0.81	0.23	1.53	8.98	22.89	32.03
45	4.43	1.39	0.12	0.03	0.01	0.48	0.27	0.85	0.24	1.62	9.44	24.25	33.86
50	4.64	1.49	0.12	0.03	0.01	0.50	0.28	0.91	0.26	1.72	9.96	25.79	35.92

Table VOC BUS 37
Economic Cost of Operation of Buses on Four Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.18	0.88	0.12	0.04	0.00	0.37	0.21	0.57	0.16	1.07	6.60	16.08	22.80
5	3.28	0.92	0.12	0.04	0.00	0.39	0.21	0.59	0.17	1.12	6.84	16.74	23.71
10	3.39	0.97	0.12	0.04	0.00	0.40	0.22	0.61	0.18	1.16	7.10	17.46	24.69
15	3.51	1.02	0.12	0.04	0.00	0.42	0.23	0.64	0.18	1.22	7.38	18.24	25.76
20	3.64	1.07	0.12	0.04	0.00	0.43	0.24	0.67	0.19	1.27	7.69	19.10	26.93
25	3.78	1.13	0.12	0.04	0.00	0.45	0.25	0.71	0.20	1.34	8.02	20.04	28.21
30	3.93	1.20	0.12	0.04	0.00	0.47	0.26	0.74	0.21	1.41	8.38	21.08	29.62
35	4.10	1.27	0.12	0.04	0.01	0.48	0.27	0.78	0.22	1.48	8.78	22.23	31.18
40	4.28	1.36	0.12	0.04	0.01	0.50	0.28	0.83	0.24	1.57	9.23	23.52	32.91
45	4.48	1.46	0.13	0.04	0.01	0.52	0.29	0.88	0.25	1.66	9.72	24.96	34.86
50	4.70	1.57	0.13	0.04	0.01	0.54	0.30	0.94	0.27	1.77	10.27	26.60	37.05

Table VOC BUS 38
Economic Cost of Operation of Buses on Four Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.18	0.91	0.12	0.05	0.00	0.40	0.22	0.58	0.17	1.09	6.73	16.39	23.25
5	3.29	0.95	0.13	0.05	0.00	0.42	0.23	0.60	0.17	1.14	6.98	17.08	24.19
10	3.40	1.00	0.13	0.05	0.00	0.43	0.24	0.63	0.18	1.19	7.25	17.82	25.22
15	3.53	1.05	0.13	0.05	0.00	0.45	0.25	0.66	0.19	1.24	7.54	18.64	26.33
20	3.66	1.11	0.13	0.05	0.00	0.47	0.26	0.69	0.20	1.30	7.86	19.54	27.56
25	3.81	1.17	0.13	0.05	0.00	0.48	0.27	0.72	0.21	1.37	8.21	20.52	28.90
30	3.97	1.25	0.13	0.05	0.00	0.50	0.28	0.76	0.22	1.44	8.60	21.61	30.38
35	4.14	1.33	0.13	0.05	0.01	0.52	0.29	0.80	0.23	1.52	9.02	22.83	32.02
40	4.33	1.42	0.13	0.05	0.01	0.54	0.30	0.85	0.24	1.61	9.49	24.19	33.86
45	4.54	1.53	0.13	0.05	0.01	0.56	0.31	0.91	0.26	1.71	10.01	25.72	35.92
50	4.77	1.66	0.14	0.05	0.01	0.58	0.32	0.97	0.28	1.83	10.60	27.45	38.25

Table VOC BUS 39
Economic Cost of Operation of Buses on Four Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.19	0.94	0.13	0.06	0.00	0.43	0.24	0.59	0.17	1.11	6.86	16.71	23.71
5	3.30	0.98	0.13	0.06	0.00	0.45	0.25	0.61	0.18	1.16	7.12	17.42	24.69
10	3.41	1.03	0.14	0.06	0.00	0.46	0.26	0.64	0.18	1.21	7.41	18.20	25.77
15	3.54	1.09	0.14	0.06	0.00	0.48	0.26	0.67	0.19	1.27	7.71	19.06	26.93
20	3.68	1.15	0.14	0.06	0.00	0.50	0.27	0.70	0.20	1.33	8.05	20.00	28.22
25	3.84	1.22	0.14	0.06	0.00	0.52	0.29	0.74	0.21	1.40	8.42	21.03	29.63
30	4.00	1.30	0.14	0.06	0.00	0.54	0.30	0.78	0.22	1.48	8.83	22.18	31.19
35	4.18	1.39	0.14	0.06	0.01	0.56	0.31	0.83	0.24	1.56	9.28	23.46	32.92
40	4.38	1.50	0.14	0.06	0.01	0.58	0.32	0.88	0.25	1.66	9.77	24.89	34.86
45	4.60	1.62	0.14	0.06	0.01	0.60	0.33	0.93	0.27	1.77	10.33	26.52	37.05
50	4.85	1.76	0.14	0.06	0.01	0.62	0.34	1.00	0.29	1.89	10.96	28.37	39.54

Table VOC BUS 40
Economic Cost of Operation of Buses on Four Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.19	0.97	0.14	0.07	0.00	0.46	0.25	0.60	0.17	1.14	7.00	17.04	24.20
5	3.31	1.02	0.14	0.07	0.00	0.48	0.26	0.63	0.18	1.19	7.27	17.79	25.22
10	3.43	1.07	0.14	0.07	0.00	0.50	0.27	0.66	0.19	1.24	7.57	18.60	26.34
15	3.56	1.13	0.14	0.07	0.00	0.52	0.28	0.69	0.20	1.30	7.90	19.49	27.57
20	3.71	1.20	0.15	0.07	0.00	0.54	0.30	0.72	0.21	1.37	8.25	20.48	28.91
25	3.87	1.28	0.15	0.07	0.00	0.56	0.31	0.76	0.22	1.44	8.64	21.56	30.39
30	4.04	1.36	0.15	0.07	0.00	0.58	0.32	0.80	0.23	1.52	9.07	22.77	32.04
35	4.23	1.46	0.15	0.07	0.01	0.60	0.33	0.85	0.24	1.61	9.55	24.12	33.87
40	4.44	1.58	0.15	0.07	0.01	0.62	0.34	0.90	0.26	1.71	10.08	25.64	35.93
45	4.67	1.71	0.15	0.07	0.01	0.65	0.36	0.96	0.28	1.82	10.68	27.37	38.26
50	4.93	1.87	0.15	0.07	0.01	0.67	0.37	1.03	0.30	1.96	11.35	29.34	40.92

Table VOC BUS 41
Economic Cost of Operation of Buses on Four Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	3.20	1.00	0.15	0.08	0.00	0.50	0.27	0.61	0.18	1.16	7.15	17.39	24.71
5	3.32	1.05	0.15	0.08	0.00	0.52	0.28	0.64	0.18	1.21	7.44	18.17	25.78
10	3.45	1.11	0.15	0.08	0.00	0.54	0.30	0.67	0.19	1.27	7.75	19.02	26.95
15	3.59	1.18	0.15	0.08	0.00	0.56	0.31	0.70	0.20	1.33	8.10	19.95	28.23
20	3.74	1.25	0.15	0.08	0.00	0.58	0.32	0.74	0.21	1.40	8.47	20.98	29.64
25	3.90	1.33	0.16	0.08	0.00	0.60	0.33	0.78	0.22	1.47	8.88	22.12	31.20
30	4.08	1.43	0.16	0.08	0.00	0.62	0.34	0.82	0.24	1.56	9.34	23.39	32.94
35	4.28	1.54	0.16	0.08	0.01	0.65	0.35	0.87	0.25	1.65	9.84	24.82	34.88
40	4.50	1.66	0.16	0.08	0.01	0.67	0.37	0.93	0.27	1.76	10.41	26.44	37.07
45	4.74	1.81	0.16	0.08	0.01	0.69	0.38	1.00	0.28	1.88	11.05	28.27	39.56
50	5.02	1.99	0.16	0.08	0.01	0.72	0.40	1.07	0.31	2.03	11.78	30.39	42.41

Table VOC BUS 42
Financial Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	5.77	1.29	0.26	0.09	0.04	0.66	0.26	1.22	0.31	1.26	11.15	6.81	17.97
5	6.03	1.36	0.27	0.09	0.04	0.68	0.37	1.27	0.32	1.31	11.74	7.08	18.82
10	6.31	1.43	0.27	0.09	0.04	0.71	0.39	1.32	0.33	1.36	12.25	7.37	19.62
15	6.61	1.51	0.27	0.09	0.04	0.73	0.40	1.38	0.35	1.42	12.81	7.68	20.49
20	6.93	1.61	0.27	0.09	0.05	0.76	0.42	1.44	0.36	1.49	13.40	8.02	21.42
25	7.26	1.71	0.27	0.09	0.05	0.79	0.43	1.50	0.38	1.55	14.04	8.39	22.44
30	7.62	1.83	0.28	0.09	0.05	0.82	0.45	1.58	0.40	1.63	14.74	8.80	23.54
35	8.00	1.97	0.28	0.09	0.05	0.85	0.47	1.66	0.42	1.71	15.49	9.25	24.74
40	8.41	2.13	0.28	0.09	0.05	0.88	0.48	1.75	0.44	1.81	16.32	9.75	26.07
45	8.85	2.31	0.28	0.09	0.05	0.91	0.50	1.85	0.46	1.91	17.23	10.31	27.54
50	9.33	2.54	0.29	0.09	0.06	0.95	0.52	1.96	0.49	2.02	18.25	10.93	29.18

Table VOC BUS 43
Financial Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	5.80	1.33	0.33	0.11	0.04	0.70	0.39	1.26	0.32	1.31	11.59	7.05	18.64
5	6.08	1.41	0.33	0.11	0.04	0.73	0.40	1.31	0.33	1.36	12.10	7.34	19.44
10	6.38	1.48	0.33	0.11	0.04	0.76	0.42	1.37	0.34	1.42	12.65	7.65	20.30
15	6.69	1.57	0.33	0.11	0.04	0.79	0.43	1.43	0.36	1.48	13.24	7.98	21.22
20	7.02	1.67	0.34	0.11	0.05	0.82	0.45	1.50	0.38	1.55	13.87	8.35	22.23
25	7.38	1.79	0.34	0.11	0.05	0.85	0.47	1.57	0.39	1.62	14.56	8.76	23.32
30	7.76	1.92	0.34	0.11	0.05	0.88	0.48	1.65	0.41	1.70	15.31	9.20	24.51
35	8.16	2.07	0.34	0.11	0.05	0.91	0.50	1.74	0.44	1.80	16.12	9.69	25.82
40	8.60	2.25	0.35	0.11	0.05	0.95	0.52	1.84	0.46	1.90	17.02	10.24	27.27
45	9.08	2.46	0.35	0.11	0.05	0.98	0.54	1.95	0.49	2.01	18.02	10.86	28.88
50	9.60	2.72	0.35	0.11	0.06	1.02	0.56	2.07	0.52	2.14	19.14	11.55	30.69

Table VOC BUS 44
Financial Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	5.85	1.38	0.39	0.13	0.04	0.76	0.42	1.31	0.33	1.35	11.95	7.30	19.26
5	6.14	1.46	0.40	0.13	0.04	0.79	0.43	1.36	0.34	1.41	12.50	7.61	20.11
10	6.46	1.54	0.40	0.13	0.04	0.82	0.45	1.42	0.36	1.47	13.08	7.95	21.03
15	6.79	1.64	0.40	0.13	0.04	0.85	0.46	1.49	0.37	1.54	13.71	8.31	22.02
20	7.14	1.75	0.40	0.13	0.05	0.88	0.48	1.56	0.39	1.61	14.39	8.71	23.10
25	7.51	1.88	0.40	0.13	0.05	0.91	0.50	1.64	0.41	1.70	15.13	9.15	24.28
30	7.92	2.02	0.41	0.13	0.05	0.94	0.52	1.73	0.43	1.79	15.93	9.64	25.57
35	8.35	2.19	0.41	0.13	0.05	0.98	0.54	1.82	0.46	1.89	16.82	10.18	27.00
40	8.83	2.39	0.41	0.13	0.05	1.02	0.56	1.93	0.49	2.00	17.80	10.79	28.59
45	9.34	2.63	0.41	0.13	0.05	1.05	0.58	2.06	0.52	2.12	18.90	11.47	30.37
50	9.91	2.92	0.42	0.13	0.06	1.09	0.60	2.19	0.55	2.27	20.14	12.25	32.39

Table VOC BUS 45
Financial Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	5.91	1.43	0.46	0.15	0.04	0.81	0.45	1.36	0.34	1.40	12.35	7.58	19.93
5	6.22	1.52	0.46	0.15	0.04	0.84	0.46	1.42	0.36	1.46	12.93	7.91	20.84
10	6.55	1.61	0.46	0.15	0.04	0.88	0.48	1.48	0.37	1.53	13.55	8.27	21.82
15	6.90	1.71	0.47	0.15	0.04	0.91	0.50	1.55	0.39	1.61	14.23	8.67	22.89
20	7.27	1.83	0.47	0.15	0.05	0.94	0.52	1.63	0.41	1.69	14.95	9.10	24.06
25	7.67	1.97	0.47	0.15	0.05	0.98	0.54	1.72	0.43	1.78	15.75	9.58	25.33
30	8.10	2.13	0.47	0.15	0.05	1.02	0.56	1.81	0.46	1.87	16.62	10.12	26.74
35	8.57	2.32	0.47	0.15	0.05	1.05	0.58	1.92	0.48	1.99	17.59	10.72	28.31
40	9.08	2.55	0.48	0.15	0.05	1.09	0.60	2.04	0.51	2.11	18.67	11.39	30.06
45	9.64	2.82	0.48	0.15	0.05	1.13	0.62	2.18	0.55	2.25	19.88	12.16	32.04
50	10.26	3.16	0.48	0.15	0.06	1.18	0.65	2.34	0.59	2.41	21.27	13.04	34.31

Table VOC BUS 46
Financial Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	5.98	1.49	0.52	0.17	0.04	0.87	0.48	1.41	0.35	1.46	12.78	7.87	20.65
5	6.31	1.58	0.53	0.17	0.04	0.91	0.50	1.47	0.37	1.52	13.40	8.23	21.63
10	6.66	1.68	0.53	0.17	0.04	0.94	0.52	1.54	0.39	1.60	14.06	8.62	22.68
15	7.03	1.79	0.53	0.17	0.04	0.98	0.54	1.62	0.41	1.68	14.78	9.05	23.84
20	7.43	1.93	0.53	0.17	0.05	1.01	0.56	1.71	0.43	1.77	15.57	9.53	25.10
25	7.86	2.08	0.53	0.17	0.05	1.05	0.58	1.80	0.45	1.86	16.43	10.06	26.49
30	8.32	2.26	0.54	0.17	0.05	1.09	0.60	1.91	0.48	1.97	17.38	10.65	28.03
35	8.82	2.47	0.54	0.17	0.05	1.13	0.62	2.03	0.51	2.10	18.44	11.32	29.76
40	9.38	2.73	0.54	0.17	0.05	1.17	0.65	2.16	0.54	2.24	19.63	12.07	31.71
45	9.99	3.04	0.54	0.17	0.05	1.22	0.67	2.32	0.58	2.40	20.99	12.94	33.93
50	10.68	3.44	0.55	0.17	0.06	1.26	0.70	2.50	0.63	2.58	22.56	13.93	36.49

Table VOC BUS 47
Financial Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	6.07	1.55	0.59	0.19	0.04	0.94	0.52	1.47	0.37	1.52	13.24	8.19	21.43
5	6.42	1.64	0.59	0.19	0.04	0.98	0.54	1.54	0.39	1.59	13.90	8.58	22.48
10	6.79	1.75	0.59	0.19	0.04	1.01	0.56	1.61	0.41	1.67	14.62	9.00	23.62
15	7.18	1.88	0.60	0.19	0.04	1.05	0.58	1.70	0.43	1.76	15.40	9.48	24.87
20	7.61	2.03	0.60	0.19	0.05	1.09	0.60	1.79	0.45	1.85	16.25	10.00	26.25
25	8.07	2.20	0.60	0.19	0.05	1.13	0.62	1.90	0.48	1.96	17.18	10.58	27.77
30	8.57	2.40	0.60	0.19	0.05	1.17	0.65	2.01	0.51	2.08	18.22	11.24	29.47
35	9.12	2.64	0.60	0.19	0.05	1.22	0.67	2.15	0.54	2.22	19.39	11.99	31.38
40	9.72	2.93	0.61	0.19	0.05	1.26	0.69	2.30	0.58	2.38	20.72	12.84	33.55
45	10.40	3.30	0.61	0.19	0.05	1.31	0.72	2.48	0.62	2.56	22.24	13.82	36.06
50	11.17	3.78	0.61	0.19	0.06	1.36	0.75	2.68	0.67	2.77	24.04	14.96	39.00

Table VOC BUS 48
Financial Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	6.18	1.61	0.65	0.21	0.04	1.01	0.56	1.53	0.38	1.58	13.75	8.53	22.28
5	6.55	1.72	0.66	0.21	0.04	1.05	0.58	1.60	0.40	1.66	14.46	8.96	23.41
10	6.94	1.84	0.66	0.21	0.04	1.09	0.60	1.69	0.42	1.75	15.23	9.42	24.65
15	7.36	1.98	0.66	0.21	0.04	1.13	0.62	1.78	0.45	1.84	16.07	9.94	26.01
20	7.81	2.14	0.66	0.21	0.05	1.17	0.64	1.88	0.47	1.95	16.99	10.52	27.51
25	8.31	2.33	0.66	0.21	0.05	1.22	0.67	2.00	0.50	2.07	18.01	11.17	29.18
30	8.85	2.56	0.67	0.21	0.05	1.26	0.69	2.13	0.54	2.20	19.16	11.90	31.06
35	9.45	2.83	0.67	0.21	0.05	1.31	0.72	2.28	0.57	2.36	20.46	12.74	33.20
40	10.12	3.17	0.67	0.21	0.05	1.36	0.75	2.46	0.62	2.54	21.94	13.71	35.65
45	10.88	3.61	0.67	0.21	0.05	1.41	0.77	2.66	0.67	2.75	23.68	14.83	38.51
50	11.75	4.19	0.68	0.21	0.06	1.46	0.80	2.89	0.73	2.99	25.76	16.15	41.91

Table VOC BUS 49
Financial Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	6.30	1.68	0.72	0.22	0.04	1.09	0.60	1.60	0.40	1.65	14.30	8.91	23.21
5	6.69	1.80	0.72	0.23	0.04	1.13	0.62	1.68	0.42	1.74	15.06	9.37	24.43
10	7.11	1.93	0.72	0.23	0.04	1.17	0.64	1.77	0.45	1.83	15.89	9.88	25.77
15	7.56	2.08	0.73	0.23	0.04	1.21	0.67	1.87	0.47	1.94	16.80	10.45	27.25
20	8.05	2.26	0.73	0.23	0.05	1.26	0.69	1.99	0.50	2.05	17.81	11.09	28.90
25	8.59	2.48	0.73	0.23	0.05	1.31	0.72	2.12	0.53	2.19	18.94	11.82	30.75
30	9.18	2.74	0.73	0.23	0.05	1.36	0.75	2.27	0.57	2.34	20.21	12.64	32.85
35	9.85	3.06	0.73	0.23	0.05	1.41	0.77	2.44	0.61	2.52	21.66	13.59	35.25
40	10.59	3.46	0.74	0.23	0.05	1.46	0.80	2.63	0.66	2.72	23.35	14.70	38.05
45	11.45	3.99	0.74	0.23	0.05	1.51	0.83	2.87	0.72	2.96	25.35	16.00	41.35
50	12.44	4.70	0.74	0.23	0.06	1.57	0.86	3.14	0.79	3.25	27.79	17.55	45.34

Table VOC BUS 50
Financial Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	6.45	1.76	0.78	0.24	0.04	1.17	0.64	1.67	0.42	1.73	14.90	9.32	24.22
5	6.86	1.89	0.79	0.24	0.04	1.21	0.67	1.76	0.44	1.82	15.72	9.82	25.54
10	7.31	2.03	0.79	0.24	0.04	1.26	0.69	1.86	0.47	1.92	16.62	10.39	27.01
15	7.80	2.20	0.79	0.25	0.04	1.30	0.72	1.97	0.50	2.04	17.61	11.02	28.63
20	8.33	2.40	0.79	0.25	0.05	1.35	0.74	2.10	0.53	2.17	18.72	11.74	30.46
25	8.92	2.65	0.79	0.25	0.05	1.40	0.77	2.25	0.57	2.32	19.97	12.55	32.52
30	9.57	2.94	0.80	0.25	0.05	1.46	0.80	2.42	0.61	2.50	21.39	13.49	34.87
35	10.31	3.32	0.80	0.25	0.05	1.51	0.83	2.61	0.66	2.70	23.03	14.57	37.60
40	11.15	3.80	0.80	0.25	0.05	1.57	0.86	2.84	0.71	2.94	24.97	15.85	40.82
45	12.13	4.44	0.80	0.25	0.05	1.63	0.90	3.11	0.78	3.22	27.31	17.37	44.68
50	13.29	5.35	0.81	0.25	0.06	1.69	0.93	3.44	0.87	3.56	30.24	19.21	49.45

Table VOC BUS 51
Financial Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 11000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	6.62	1.84	0.85	0.26	0.04	1.26	0.69	1.75	0.44	1.81	15.55	9.77	25.32
5	7.06	1.98	0.85	0.26	0.04	1.30	0.72	1.85	0.46	1.91	16.44	10.32	26.77
10	7.54	2.14	0.85	0.26	0.04	1.35	0.74	1.96	0.49	2.03	17.42	10.95	28.37
15	8.07	2.34	0.86	0.26	0.04	1.40	0.77	2.09	0.52	2.16	18.51	11.65	30.17
20	8.65	2.56	0.86	0.27	0.05	1.46	0.80	2.23	0.56	2.31	19.74	12.46	32.19
25	9.29	2.84	0.86	0.27	0.05	1.51	0.83	2.40	0.60	2.48	21.13	13.38	34.50
30	10.02	3.19	0.86	0.27	0.05	1.57	0.86	2.59	0.65	2.68	22.73	14.45	37.17
35	10.85	3.63	0.86	0.27	0.05	1.63	0.89	2.81	0.71	2.91	24.61	15.70	40.31
40	11.81	4.21	0.87	0.27	0.05	1.69	0.93	3.08	0.77	3.18	26.86	17.19	44.06
45	12.95	5.02	0.87	0.27	0.05	1.75	0.96	3.40	0.86	3.52	29.65	19.00	48.65
50	14.34	6.21	0.87	0.27	0.06	1.82	1.00	3.80	0.96	3.93	33.25	21.22	54.48

Table VOC BUS 52
Financial Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 12000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	6.81	1.93	0.91	0.28	0.04	1.35	0.74	1.84	0.46	1.90	16.27	10.26	26.53
5	7.29	2.09	0.92	0.28	0.04	1.40	0.77	1.95	0.49	2.01	17.24	10.88	28.12
10	7.81	2.27	0.92	0.28	0.04	1.45	0.80	2.07	0.52	2.14	18.31	11.57	29.89
15	8.38	2.49	0.92	0.28	0.04	1.51	0.83	2.22	0.56	2.29	19.52	12.37	31.88
20	9.02	2.75	0.92	0.28	0.05	1.56	0.86	2.38	0.60	2.46	20.88	13.27	34.15
25	9.74	3.07	0.92	0.29	0.05	1.62	0.89	2.57	0.65	2.65	22.44	14.32	36.76
30	10.55	3.47	0.93	0.29	0.05	1.68	0.93	2.79	0.70	2.88	24.27	15.55	39.82
35	11.50	4.01	0.93	0.29	0.05	1.75	0.96	3.05	0.77	3.15	26.45	17.02	43.46
40	12.62	4.73	0.93	0.29	0.05	1.81	1.00	3.37	0.85	3.48	29.12	18.78	47.90
45	13.98	5.77	0.93	0.29	0.05	1.88	1.03	3.76	0.94	3.88	32.52	20.96	53.48
50	15.68	7.40	0.94	0.29	0.06	1.95	1.07	4.25	1.07	4.39	37.09	23.71	60.80

Table VOC BUS 53
Financial Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 13000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	7.03	2.04	0.98	0.30	0.04	1.45	0.80	1.94	0.49	2.00	17.06	10.81	27.87
5	7.55	2.21	0.98	0.30	0.04	1.51	0.83	2.06	0.52	2.13	18.12	11.50	29.62
10	8.12	2.41	0.98	0.30	0.04	1.56	0.86	2.20	0.55	2.27	19.30	12.28	31.58
15	8.75	2.66	0.99	0.30	0.04	1.62	0.89	2.36	0.59	2.44	20.64	13.17	33.81
20	9.46	2.96	0.99	0.30	0.05	1.68	0.92	2.54	0.64	2.63	22.17	14.20	36.37
25	10.26	3.33	0.99	0.30	0.05	1.74	0.96	2.76	0.69	2.85	23.95	15.41	39.36
30	11.19	3.82	0.99	0.30	0.05	1.81	1.00	3.02	0.76	3.12	26.06	16.85	42.90
35	12.29	4.47	0.99	0.31	0.05	1.88	1.03	3.33	0.84	3.44	28.62	18.58	47.20
40	13.62	5.39	1.00	0.31	0.05	1.95	1.07	3.71	0.93	3.83	31.86	20.70	52.56
45	15.28	6.78	1.00	0.31	0.05	2.02	1.11	4.19	1.05	4.33	36.12	23.38	59.50
50	17.43	9.15	1.00	0.31	0.06	2.10	1.15	4.81	1.21	4.97	42.19	26.84	69.04

Table VOC BUS 54
Financial Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 14000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	7.29	2.15	1.04	0.32	0.04	1.56	0.86	2.05	0.51	2.11	17.94	11.42	29.35
5	7.85	2.34	1.05	0.32	0.04	1.62	0.89	2.18	0.55	2.26	19.10	12.19	31.29
10	8.48	2.57	1.05	0.32	0.04	1.68	0.92	2.34	0.59	2.42	20.41	13.07	33.48
15	9.17	2.85	1.05	0.32	0.04	1.74	0.96	2.52	0.63	2.61	21.91	14.08	35.99
20	9.97	3.20	1.05	0.32	0.05	1.81	0.99	2.74	0.69	2.83	23.64	15.27	38.92
25	10.88	3.65	1.05	0.32	0.05	1.88	1.03	2.99	0.75	3.09	25.69	16.68	42.37
30	11.96	4.24	1.06	0.32	0.05	1.95	1.07	3.29	0.83	3.40	28.16	18.37	46.54
35	13.26	5.05	1.06	0.32	0.05	2.02	1.11	3.66	0.92	3.79	31.25	20.45	51.70
40	14.88	6.26	1.06	0.33	0.05	2.10	1.15	4.13	1.04	4.27	35.26	23.06	58.32
45	16.97	8.23	1.06	0.33	0.05	2.17	1.20	4.73	1.19	4.89	40.83	26.42	67.25
50	19.83	12.00	1.07	0.33	0.06	2.26	1.24	5.54	1.39	5.73	49.44	30.94	80.38

Table VOC BUS 55
Financial Cost of Operation of Buses on Single Lane Roads (Rs/km)

Roughness = 15000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	7.59	2.28	1.11	0.34	0.04	1.68	0.92	2.17	0.54	2.24	18.91	12.10	31.00
5	8.20	2.49	1.11	0.34	0.04	1.74	0.96	2.32	0.58	2.40	20.19	12.97	33.16
10	8.89	2.76	1.11	0.34	0.04	1.81	0.99	2.50	0.63	2.59	21.66	13.97	35.63
15	9.68	3.08	1.12	0.34	0.04	1.87	1.03	2.71	0.68	2.80	23.36	15.13	38.49
20	10.58	3.49	1.12	0.34	0.05	1.94	1.07	2.96	0.74	3.06	25.35	16.52	41.86
25	11.63	4.03	1.12	0.34	0.05	2.02	1.11	3.26	0.82	3.37	27.74	18.17	45.91
30	12.91	4.76	1.12	0.34	0.05	2.09	1.15	3.62	0.91	3.74	30.69	20.20	50.90
35	14.48	5.81	1.12	0.34	0.05	2.17	1.19	4.07	1.02	4.21	34.49	22.74	57.23
40	16.51	7.47	1.13	0.34	0.05	2.25	1.24	4.66	1.17	4.82	39.65	26.01	65.66
45	19.27	10.45	1.13	0.34	0.05	2.34	1.28	5.44	1.37	5.63	47.31	30.38	77.70
50	23.31	17.40	1.13	0.35	0.06	2.42	1.33	6.54	1.64	6.76	60.94	36.51	97.46

Table VOC BUS 56
Financial Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	5.86	1.24	0.22	0.07	0.03	0.56	0.31	1.10	0.28	1.14	10.80	6.14	16.94
5	6.09	1.30	0.22	0.08	0.03	0.58	0.32	1.14	0.29	1.18	11.22	6.37	17.59
10	6.33	1.36	0.23	0.08	0.04	0.60	0.33	1.19	0.30	1.23	11.67	6.63	18.30
15	6.58	1.44	0.23	0.08	0.04	0.62	0.34	1.24	0.31	1.28	12.15	6.90	19.05
20	6.85	1.52	0.23	0.08	0.04	0.64	0.35	1.29	0.32	1.33	12.67	7.20	19.87
25	7.14	1.62	0.23	0.08	0.04	0.67	0.37	1.35	0.34	1.39	13.23	7.53	20.76
30	7.45	1.72	0.24	0.08	0.04	0.69	0.38	1.41	0.36	1.46	13.84	7.89	21.72
35	7.79	1.84	0.24	0.08	0.04	0.72	0.40	1.48	0.37	1.53	14.50	8.28	22.78
40	8.14	1.98	0.24	0.08	0.05	0.75	0.41	1.56	0.39	1.61	15.22	8.72	23.94
45	8.53	2.15	0.24	0.08	0.05	0.78	0.43	1.65	0.41	1.70	16.02	9.20	25.22
50	8.95	2.34	0.24	0.08	0.05	0.80	0.44	1.75	0.44	1.80	16.90	9.74	26.64

Table VOC BUS 57
Financial Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	5.87	1.28	0.27	0.09	0.03	0.60	0.33	1.13	0.28	1.16	11.04	6.28	17.32
5	6.11	1.34	0.27	0.09	0.03	0.62	0.34	1.17	0.29	1.21	11.48	6.53	18.01
10	6.35	1.41	0.27	0.09	0.04	0.64	0.35	1.22	0.31	1.26	11.95	6.79	18.74
15	6.62	1.49	0.27	0.10	0.04	0.67	0.37	1.27	0.32	1.31	12.46	7.08	19.54
20	6.90	1.59	0.28	0.10	0.04	0.69	0.38	1.33	0.33	1.37	13.00	7.40	20.40
25	7.21	1.69	0.28	0.10	0.04	0.72	0.40	1.39	0.35	1.43	13.59	7.75	21.34
30	7.53	1.80	0.28	0.10	0.04	0.75	0.41	1.46	0.37	1.50	14.23	8.12	22.36
35	7.88	1.94	0.28	0.10	0.04	0.77	0.43	1.53	0.38	1.58	14.93	8.54	23.48
40	8.25	2.09	0.28	0.10	0.05	0.80	0.44	1.61	0.41	1.67	15.70	9.01	24.71
45	8.66	2.27	0.29	0.10	0.05	0.83	0.46	1.71	0.43	1.76	16.56	9.52	26.08
50	9.10	2.49	0.29	0.10	0.05	0.86	0.48	1.81	0.45	1.87	17.51	10.10	27.61

Table VOC BUS 58
Financial Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	5.89	1.32	0.31	0.11	0.03	0.64	0.35	1.15	0.29	1.19	11.29	6.43	17.72
5	6.13	1.39	0.31	0.11	0.03	0.67	0.37	1.20	0.30	1.24	11.75	6.69	18.44
10	6.39	1.47	0.31	0.11	0.04	0.69	0.38	1.25	0.31	1.29	12.25	6.97	19.22
15	6.67	1.55	0.32	0.11	0.04	0.72	0.39	1.30	0.33	1.35	12.78	7.27	20.05
20	6.96	1.65	0.32	0.12	0.04	0.75	0.41	1.36	0.34	1.41	13.36	7.61	20.96
25	7.28	1.76	0.32	0.12	0.04	0.77	0.43	1.43	0.36	1.48	13.98	7.97	21.95
30	7.61	1.89	0.32	0.12	0.04	0.80	0.44	1.50	0.38	1.55	14.66	8.37	23.04
35	7.98	2.04	0.33	0.12	0.04	0.83	0.46	1.58	0.40	1.63	15.41	8.82	24.23
40	8.37	2.21	0.33	0.12	0.05	0.86	0.47	1.67	0.42	1.73	16.23	9.31	25.54
45	8.80	2.42	0.33	0.12	0.05	0.90	0.49	1.77	0.44	1.83	17.14	9.87	27.01
50	9.27	2.66	0.33	0.12	0.05	0.93	0.51	1.88	0.47	1.94	18.17	10.49	28.66

Table VOC BUS 59
Financial Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	5.91	1.37	0.35	0.13	0.03	0.69	0.38	1.18	0.30	1.22	11.56	6.58	18.15
5	6.16	1.44	0.36	0.13	0.03	0.72	0.39	1.23	0.31	1.27	12.05	6.86	18.90
10	6.43	1.53	0.36	0.13	0.04	0.74	0.41	1.28	0.32	1.32	12.57	7.15	19.72
15	6.72	1.62	0.36	0.13	0.04	0.77	0.42	1.34	0.34	1.38	13.13	7.47	20.60
20	7.03	1.73	0.36	0.13	0.04	0.80	0.44	1.40	0.35	1.45	13.74	7.83	21.56
25	7.36	1.85	0.37	0.13	0.04	0.83	0.46	1.47	0.37	1.52	14.40	8.21	22.61
30	7.71	1.99	0.37	0.14	0.04	0.86	0.47	1.55	0.39	1.60	15.12	8.64	23.76
35	8.09	2.15	0.37	0.14	0.04	0.89	0.49	1.63	0.41	1.69	15.91	9.11	25.03
40	8.51	2.35	0.37	0.14	0.05	0.93	0.51	1.73	0.43	1.79	16.79	9.64	26.44
45	8.96	2.58	0.38	0.14	0.05	0.96	0.53	1.83	0.46	1.90	17.78	10.24	28.02
50	9.46	2.86	0.38	0.14	0.05	1.00	0.55	1.96	0.49	2.02	18.89	10.91	29.81

Table VOC BUS 60
Financial Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	5.94	1.42	0.40	0.15	0.03	0.74	0.41	1.21	0.30	1.25	11.85	6.75	18.60
5	6.20	1.50	0.40	0.15	0.03	0.77	0.42	1.26	0.32	1.30	12.36	7.03	19.39
10	6.48	1.59	0.40	0.15	0.04	0.80	0.44	1.32	0.33	1.36	12.91	7.34	20.25
15	6.78	1.69	0.41	0.15	0.04	0.83	0.46	1.38	0.35	1.42	13.50	7.68	21.18
20	7.10	1.81	0.41	0.15	0.04	0.86	0.47	1.44	0.36	1.49	14.14	8.06	22.20
25	7.44	1.94	0.41	0.15	0.04	0.89	0.49	1.52	0.38	1.57	14.84	8.47	23.31
30	7.82	2.10	0.41	0.15	0.04	0.93	0.51	1.60	0.40	1.65	15.61	8.92	24.54
35	8.22	2.28	0.42	0.16	0.04	0.96	0.53	1.69	0.42	1.75	16.46	9.43	25.89
40	8.65	2.50	0.42	0.16	0.05	1.00	0.55	1.79	0.45	1.85	17.41	10.00	27.41
45	9.13	2.76	0.42	0.16	0.05	1.04	0.57	1.91	0.48	1.97	18.48	10.64	29.12
50	9.66	3.09	0.42	0.16	0.05	1.07	0.59	2.04	0.51	2.11	19.69	11.37	31.06

Table VOC BUS 61
Financial Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	5.97	1.47	0.44	0.17	0.03	0.80	0.44	1.24	0.31	1.28	12.16	6.92	19.08
5	6.25	1.56	0.45	0.17	0.03	0.83	0.46	1.29	0.33	1.34	12.70	7.22	19.92
10	6.54	1.66	0.45	0.17	0.04	0.86	0.47	1.35	0.34	1.40	13.27	7.55	20.82
15	6.85	1.77	0.45	0.17	0.04	0.89	0.49	1.42	0.36	1.46	13.90	7.91	21.81
20	7.18	1.90	0.45	0.17	0.04	0.93	0.51	1.49	0.37	1.54	14.58	8.30	22.88
25	7.54	2.04	0.45	0.17	0.04	0.96	0.53	1.57	0.39	1.62	15.32	8.74	24.07
30	7.93	2.22	0.46	0.17	0.04	1.00	0.55	1.65	0.42	1.71	16.15	9.23	25.37
35	8.36	2.42	0.46	0.17	0.04	1.03	0.57	1.75	0.44	1.81	17.06	9.77	26.83
40	8.82	2.67	0.46	0.17	0.05	1.07	0.59	1.86	0.47	1.92	18.08	10.38	28.46
45	9.32	2.97	0.46	0.18	0.05	1.11	0.61	1.98	0.50	2.05	19.24	11.07	30.31
50	9.89	3.35	0.47	0.18	0.05	1.15	0.63	2.13	0.53	2.20	20.58	11.86	32.44

Table VOC BUS 62
Financial Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	6.01	1.53	0.49	0.19	0.03	0.86	0.47	1.27	0.32	1.32	12.49	7.10	19.59
5	6.30	1.62	0.49	0.19	0.03	0.89	0.49	1.33	0.33	1.37	13.05	7.42	20.47
10	6.60	1.73	0.49	0.19	0.04	0.92	0.51	1.39	0.35	1.44	13.66	7.76	21.43
15	6.93	1.85	0.49	0.19	0.04	0.96	0.53	1.46	0.37	1.51	14.32	8.14	22.47
20	7.28	1.99	0.50	0.19	0.04	1.00	0.55	1.53	0.39	1.59	15.05	8.57	23.61
25	7.65	2.16	0.50	0.19	0.04	1.03	0.57	1.62	0.41	1.67	15.84	9.03	24.87
30	8.06	2.35	0.50	0.19	0.04	1.07	0.59	1.71	0.43	1.77	16.72	9.55	26.27
35	8.51	2.58	0.50	0.19	0.04	1.11	0.61	1.82	0.46	1.88	17.71	10.13	27.84
40	9.00	2.87	0.51	0.19	0.05	1.15	0.63	1.93	0.49	2.00	18.82	10.79	29.61
45	9.54	3.22	0.51	0.19	0.05	1.20	0.66	2.07	0.52	2.14	20.09	11.54	31.63
50	10.14	3.67	0.51	0.20	0.05	1.24	0.68	2.22	0.56	2.30	21.57	12.41	33.97

Table VOC BUS 63
Financial Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	6.06	1.59	0.53	0.21	0.03	0.92	0.51	1.31	0.33	1.35	12.84	7.29	20.13
5	6.36	1.69	0.53	0.21	0.03	0.96	0.53	1.37	0.34	1.41	13.44	7.62	21.06
10	6.67	1.81	0.54	0.21	0.04	0.99	0.55	1.43	0.36	1.48	14.08	7.99	22.07
15	7.01	1.95	0.54	0.21	0.04	1.03	0.57	1.50	0.38	1.56	14.78	8.40	23.18
20	7.38	2.10	0.54	0.21	0.04	1.07	0.59	1.58	0.40	1.64	15.55	8.84	24.40
25	7.77	2.29	0.54	0.21	0.04	1.11	0.61	1.67	0.42	1.73	16.40	9.34	25.74
30	8.21	2.50	0.55	0.21	0.04	1.15	0.63	1.77	0.45	1.83	17.35	9.90	27.25
35	8.68	2.77	0.55	0.21	0.04	1.19	0.66	1.89	0.47	1.95	18.41	10.53	28.94
40	9.19	3.10	0.55	0.21	0.05	1.24	0.68	2.01	0.51	2.08	19.62	11.24	30.86
45	9.77	3.51	0.55	0.21	0.05	1.29	0.71	2.16	0.54	2.23	21.03	12.05	33.08
50	10.42	4.06	0.56	0.21	0.05	1.33	0.73	2.33	0.59	2.41	22.68	13.00	35.68

Table VOC BUS 64
Financial Cost of Operation of Buses on Intermediate Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	6.11	1.66	0.58	0.23	0.03	0.99	0.55	1.34	0.34	1.39	13.22	7.49	20.71
5	6.42	1.77	0.58	0.23	0.03	1.03	0.57	1.41	0.35	1.45	13.84	7.84	21.69
10	6.75	1.90	0.58	0.23	0.04	1.07	0.59	1.48	0.37	1.53	14.53	8.23	22.76
15	7.11	2.05	0.58	0.23	0.04	1.11	0.61	1.55	0.39	1.60	15.27	8.66	23.94
20	7.49	2.22	0.59	0.23	0.04	1.15	0.63	1.64	0.41	1.69	16.10	9.14	25.24
25	7.91	2.43	0.59	0.23	0.04	1.19	0.66	1.73	0.44	1.79	17.01	9.67	26.68
30	8.36	2.68	0.59	0.23	0.04	1.24	0.68	1.84	0.46	1.90	18.03	10.27	28.30
35	8.86	2.98	0.59	0.23	0.04	1.28	0.71	1.96	0.49	2.03	19.19	10.95	30.14
40	9.41	3.37	0.59	0.23	0.05	1.33	0.73	2.10	0.53	2.17	20.52	11.72	32.24
45	10.03	3.86	0.60	0.23	0.05	1.38	0.76	2.26	0.57	2.34	22.08	12.61	34.69
50	10.73	4.53	0.60	0.23	0.05	1.43	0.79	2.45	0.61	2.53	23.96	13.65	37.61

Table VOC BUS 65
Financial Cost of Operation of Buses on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	5.91	1.19	0.20	0.06	0.03	0.52	0.28	1.07	0.27	1.10	10.63	16.57	27.21
5	6.12	1.25	0.20	0.06	0.03	0.54	0.29	1.11	0.28	1.15	11.03	17.20	28.24
10	6.35	1.31	0.21	0.06	0.03	0.56	0.31	1.15	0.29	1.19	11.46	17.88	29.34
15	6.59	1.38	0.21	0.06	0.03	0.58	0.32	1.20	0.30	1.24	11.92	18.62	30.54
20	6.85	1.46	0.21	0.06	0.03	0.60	0.33	1.25	0.31	1.29	12.41	19.42	31.83
25	7.13	1.54	0.21	0.06	0.03	0.62	0.34	1.31	0.33	1.35	12.94	20.29	33.23
30	7.43	1.64	0.22	0.07	0.04	0.64	0.35	1.37	0.34	1.42	13.51	21.25	34.76
35	7.74	1.75	0.22	0.07	0.04	0.67	0.37	1.44	0.36	1.49	14.14	22.29	36.43
40	8.09	1.88	0.22	0.07	0.04	0.69	0.38	1.51	0.38	1.56	14.82	23.45	38.27
45	8.46	2.02	0.22	0.07	0.04	0.72	0.40	1.59	0.40	1.65	15.57	24.73	40.30
50	8.86	2.19	0.23	0.07	0.04	0.75	0.41	1.69	0.42	1.74	16.40	26.16	42.56

Table VOC BUS 66
Financial Cost of Operation of Buses on Two Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	5.92	1.23	0.24	0.08	0.03	0.55	0.31	1.09	0.27	1.12	10.84	16.87	27.71
5	6.14	1.29	0.24	0.08	0.03	0.58	0.32	1.13	0.28	1.17	11.26	17.52	28.78
10	6.37	1.36	0.24	0.08	0.03	0.60	0.33	1.18	0.30	1.22	11.70	18.23	29.93
15	6.63	1.43	0.24	0.08	0.03	0.62	0.34	1.22	0.31	1.27	12.18	18.99	31.17
20	6.89	1.52	0.25	0.08	0.03	0.64	0.35	1.28	0.32	1.32	12.69	19.83	32.52
25	7.18	1.61	0.25	0.08	0.03	0.67	0.37	1.34	0.34	1.38	13.25	20.74	33.98
30	7.49	1.71	0.25	0.08	0.04	0.69	0.38	1.40	0.35	1.45	13.85	21.73	35.58
35	7.82	1.83	0.25	0.08	0.04	0.72	0.39	1.47	0.37	1.52	14.51	22.83	37.34
40	8.17	1.97	0.26	0.09	0.04	0.75	0.41	1.55	0.39	1.60	15.23	24.04	39.27
45	8.56	2.13	0.26	0.09	0.04	0.77	0.43	1.64	0.41	1.69	16.02	25.39	41.41
50	8.98	2.32	0.26	0.09	0.04	0.80	0.44	1.73	0.44	1.79	16.90	26.91	43.80

Table VOC BUS 67
Financial Cost of Operation of Buses on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	5.94	1.27	0.27	0.10	0.03	0.60	0.33	1.11	0.28	1.14	11.06	17.17	28.24
5	6.16	1.34	0.27	0.10	0.03	0.62	0.34	1.15	0.29	1.19	11.49	17.85	29.35
10	6.40	1.41	0.28	0.10	0.03	0.64	0.35	1.20	0.30	1.24	11.96	18.59	30.54
15	6.66	1.49	0.28	0.10	0.03	0.67	0.37	1.25	0.31	1.29	12.45	19.38	31.84
20	6.94	1.58	0.28	0.10	0.03	0.69	0.38	1.31	0.33	1.35	12.99	20.25	33.24
25	7.24	1.68	0.28	0.10	0.03	0.72	0.39	1.37	0.34	1.41	13.57	21.20	34.77
30	7.55	1.79	0.29	0.10	0.04	0.74	0.41	1.43	0.36	1.48	14.20	22.24	36.45
35	7.90	1.93	0.29	0.10	0.04	0.77	0.42	1.51	0.38	1.56	14.90	23.39	38.29
40	8.27	2.08	0.29	0.10	0.04	0.80	0.44	1.59	0.40	1.64	15.66	24.67	40.33
45	8.67	2.26	0.29	0.11	0.04	0.83	0.46	1.68	0.42	1.74	16.50	26.09	42.59
50	9.10	2.47	0.30	0.11	0.04	0.86	0.47	1.79	0.45	1.85	17.44	27.69	45.13

Table VOC BUS 68
Financial Cost of Operation of Buses on Two Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	5.95	1.31	0.31	0.12	0.03	0.64	0.35	1.13	0.28	1.17	11.29	17.49	28.79
5	6.19	1.38	0.31	0.12	0.03	0.67	0.37	1.17	0.29	1.21	11.74	18.19	29.94
10	6.44	1.46	0.31	0.12	0.03	0.69	0.38	1.22	0.31	1.26	12.23	18.96	31.18
15	6.70	1.55	0.31	0.12	0.03	0.72	0.39	1.28	0.32	1.32	12.75	19.79	32.53
20	6.99	1.64	0.32	0.12	0.03	0.74	0.41	1.33	0.34	1.38	13.31	20.69	34.00
25	7.30	1.75	0.32	0.12	0.03	0.77	0.42	1.40	0.35	1.45	13.92	21.68	35.60
30	7.63	1.88	0.32	0.12	0.04	0.80	0.44	1.47	0.37	1.52	14.58	22.78	37.36
35	7.98	2.03	0.32	0.12	0.04	0.83	0.46	1.55	0.39	1.60	15.31	23.98	39.30
40	8.37	2.20	0.33	0.12	0.04	0.86	0.47	1.63	0.41	1.69	16.12	25.33	41.45
45	8.78	2.40	0.33	0.12	0.04	0.89	0.49	1.73	0.43	1.79	17.01	26.83	43.84
50	9.24	2.64	0.33	0.12	0.04	0.93	0.51	1.84	0.46	1.90	18.02	28.52	46.54

Table VOC BUS 69
Financial Cost of Operation of Buses on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	5.98	1.36	0.34	0.14	0.03	0.69	0.38	1.15	0.29	1.19	11.54	17.82	29.36
5	6.22	1.44	0.34	0.14	0.03	0.72	0.39	1.20	0.30	1.24	12.01	18.55	30.56
10	6.47	1.52	0.35	0.14	0.03	0.74	0.41	1.25	0.31	1.29	12.51	19.34	31.86
15	6.75	1.61	0.35	0.14	0.03	0.77	0.42	1.30	0.33	1.35	13.06	20.21	33.26
20	7.05	1.72	0.35	0.14	0.03	0.80	0.44	1.36	0.34	1.41	13.65	21.15	34.80
25	7.36	1.84	0.35	0.14	0.03	0.83	0.46	1.43	0.36	1.48	14.29	22.19	36.48
30	7.70	1.98	0.36	0.14	0.04	0.86	0.47	1.50	0.38	1.56	14.99	23.34	38.33
35	8.07	2.14	0.36	0.14	0.04	0.89	0.49	1.59	0.40	1.64	15.76	24.61	40.37
40	8.47	2.33	0.36	0.14	0.04	0.93	0.51	1.68	0.42	1.73	16.61	26.02	42.64
45	8.91	2.56	0.36	0.14	0.04	0.96	0.53	1.78	0.45	1.84	17.57	27.61	45.18
50	9.39	2.83	0.37	0.14	0.04	1.00	0.55	1.90	0.48	1.96	18.65	29.41	48.06

Table VOC BUS 70
Financial Cost of Operation of Buses on Two Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	6.00	1.41	0.38	0.16	0.03	0.74	0.41	1.17	0.29	1.21	11.80	18.16	29.96
5	6.25	1.49	0.38	0.16	0.03	0.77	0.42	1.22	0.31	1.26	12.29	18.92	31.21
10	6.52	1.58	0.38	0.16	0.03	0.80	0.44	1.27	0.32	1.32	12.82	19.75	32.56
15	6.80	1.68	0.38	0.16	0.03	0.83	0.46	1.33	0.33	1.38	13.39	20.65	34.03
20	7.11	1.80	0.39	0.16	0.03	0.86	0.47	1.40	0.35	1.44	14.00	21.64	35.64
25	7.43	1.93	0.39	0.16	0.03	0.89	0.49	1.47	0.37	1.51	14.68	22.72	37.40
30	7.79	2.08	0.39	0.16	0.04	0.92	0.51	1.54	0.39	1.60	15.42	23.93	39.35
35	8.17	2.26	0.39	0.16	0.04	0.96	0.53	1.63	0.41	1.68	16.24	25.26	41.50
40	8.59	2.48	0.40	0.16	0.04	1.00	0.55	1.73	0.43	1.78	17.15	26.76	43.91
45	9.04	2.74	0.40	0.16	0.04	1.03	0.57	1.83	0.46	1.90	18.17	28.44	46.61
50	9.54	3.06	0.40	0.16	0.04	1.07	0.59	1.96	0.49	2.02	19.34	30.35	49.69

Table VOC BUS 71
Financial Cost of Operation of Buses on Two Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	6.03	1.46	0.41	0.18	0.03	0.80	0.44	1.19	0.30	1.23	12.07	18.52	30.59
5	6.29	1.55	0.41	0.18	0.03	0.83	0.45	1.24	0.31	1.29	12.59	19.31	31.89
10	6.56	1.65	0.42	0.18	0.03	0.86	0.47	1.30	0.33	1.34	13.14	20.17	33.30
15	6.86	1.76	0.42	0.18	0.03	0.89	0.49	1.36	0.34	1.41	13.73	21.11	34.84
20	7.17	1.89	0.42	0.18	0.03	0.92	0.51	1.43	0.36	1.48	14.39	22.14	36.53
25	7.51	2.03	0.42	0.18	0.03	0.96	0.53	1.50	0.38	1.55	15.10	23.28	38.38
30	7.88	2.20	0.43	0.18	0.04	0.99	0.55	1.58	0.40	1.64	15.88	24.54	40.43
35	8.28	2.40	0.43	0.18	0.04	1.03	0.57	1.67	0.42	1.73	16.75	25.95	42.71
40	8.71	2.65	0.43	0.18	0.04	1.07	0.59	1.78	0.45	1.84	17.73	27.53	45.26
45	9.19	2.95	0.43	0.18	0.04	1.11	0.61	1.89	0.48	1.95	18.83	29.32	48.15
50	9.71	3.32	0.43	0.18	0.04	1.15	0.63	2.02	0.51	2.09	20.10	31.35	51.45

Table VOC BUS 72
Financial Cost of Operation of Buses on Two Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	6.06	1.52	0.45	0.20	0.03	0.86	0.47	1.22	0.31	1.26	12.37	18.88	31.25
5	6.33	1.62	0.45	0.20	0.03	0.89	0.49	1.27	0.32	1.31	12.90	19.71	32.61
10	6.61	1.72	0.45	0.20	0.03	0.92	0.51	1.33	0.33	1.37	13.48	20.60	34.08
15	6.92	1.84	0.45	0.20	0.03	0.96	0.53	1.39	0.35	1.44	14.11	21.59	35.70
20	7.24	1.98	0.46	0.20	0.03	0.99	0.55	1.46	0.37	1.51	14.79	22.67	37.46
25	7.60	2.14	0.46	0.20	0.03	1.03	0.57	1.54	0.39	1.59	15.55	23.87	39.41
30	7.98	2.34	0.46	0.20	0.04	1.07	0.59	1.62	0.41	1.68	16.38	25.20	41.58
35	8.39	2.56	0.46	0.20	0.04	1.11	0.61	1.72	0.43	1.78	17.31	26.68	43.99
40	8.85	2.84	0.46	0.20	0.04	1.15	0.63	1.83	0.46	1.89	18.36	28.36	46.71
45	9.34	3.19	0.47	0.20	0.04	1.19	0.66	1.95	0.49	2.02	19.55	30.25	49.81
50	9.90	3.63	0.47	0.20	0.04	1.24	0.68	2.09	0.53	2.16	20.94	32.42	53.36

Table VOC BUS 73
Financial Cost of Operation of Buses on Two Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	6.10	1.58	0.48	0.22	0.03	0.92	0.51	1.24	0.31	1.28	12.68	19.27	31.94
5	6.37	1.69	0.48	0.22	0.03	0.96	0.53	1.30	0.33	1.34	13.24	20.12	33.36
10	6.67	1.80	0.49	0.22	0.03	0.99	0.54	1.36	0.34	1.40	13.84	21.06	34.90
15	6.98	1.93	0.49	0.22	0.03	1.03	0.57	1.42	0.36	1.47	14.50	22.09	36.60
20	7.32	2.09	0.49	0.22	0.03	1.07	0.59	1.50	0.38	1.55	15.23	23.23	38.45
25	7.69	2.27	0.49	0.22	0.03	1.11	0.61	1.58	0.40	1.63	16.03	24.48	40.51
30	8.08	2.49	0.50	0.22	0.04	1.15	0.63	1.67	0.42	1.73	16.92	25.88	42.80
35	8.51	2.75	0.50	0.22	0.04	1.19	0.66	1.77	0.45	1.83	17.91	27.46	45.37
40	8.99	3.07	0.50	0.22	0.04	1.24	0.68	1.88	0.47	1.95	19.04	29.23	48.27
45	9.51	3.48	0.50	0.22	0.04	1.28	0.71	2.02	0.51	2.08	20.35	31.25	51.60
50	10.10	4.01	0.50	0.22	0.04	1.33	0.73	2.16	0.54	2.24	21.88	33.57	55.45

Table VOC BUS 74
Financial Cost of Operation of Buses on Four Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	6.16	1.03	0.17	0.01	0.00	0.45	0.25	0.96	0.24	1.00	10.26	14.95	25.21
5	6.33	1.07	0.17	0.01	0.00	0.47	0.26	1.00	0.25	1.03	10.58	15.52	26.11
10	6.51	1.11	0.17	0.01	0.00	0.48	0.27	1.04	0.26	1.08	10.93	16.14	27.07
15	6.70	1.16	0.17	0.01	0.00	0.50	0.28	1.08	0.27	1.12	11.31	16.80	28.11
20	6.91	1.22	0.18	0.01	0.01	0.52	0.29	1.13	0.28	1.17	11.72	17.53	29.25
25	7.15	1.28	0.18	0.01	0.01	0.54	0.30	1.18	0.30	1.22	12.16	18.32	30.48
30	7.40	1.34	0.18	0.01	0.01	0.56	0.31	1.24	0.31	1.28	12.64	19.18	31.82
35	7.67	1.42	0.18	0.01	0.01	0.58	0.32	1.30	0.33	1.34	13.16	20.13	33.30
40	7.97	1.50	0.19	0.01	0.01	0.60	0.33	1.37	0.34	1.41	13.73	21.18	34.92
45	8.29	1.59	0.19	0.01	0.01	0.63	0.34	1.44	0.36	1.49	14.36	22.35	36.71
50	8.65	1.69	0.19	0.01	0.02	0.65	0.36	1.52	0.38	1.58	15.05	23.65	38.70

Table VOC BUS 75
Financial Cost of Operation of Buses on Four Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	6.15	1.06	0.19	0.03	0.00	0.48	0.27	0.98	0.25	1.01	10.41	15.22	25.63
5	6.32	1.10	0.19	0.03	0.00	0.50	0.28	1.02	0.26	1.05	10.74	15.81	26.55
10	6.51	1.15	0.19	0.03	0.00	0.52	0.29	1.06	0.27	1.10	11.11	16.45	27.56
15	6.71	1.20	0.19	0.03	0.00	0.54	0.30	1.11	0.28	1.14	11.50	17.14	28.64
20	6.93	1.26	0.19	0.03	0.01	0.56	0.31	1.15	0.29	1.19	11.93	17.90	29.83
25	7.18	1.32	0.20	0.03	0.01	0.58	0.32	1.21	0.30	1.25	12.39	18.72	31.11
30	7.44	1.39	0.20	0.03	0.01	0.60	0.33	1.27	0.32	1.31	12.89	19.62	32.52
35	7.72	1.47	0.20	0.03	0.01	0.63	0.34	1.33	0.33	1.37	13.44	20.62	34.06
40	8.03	1.56	0.20	0.03	0.01	0.65	0.36	1.40	0.35	1.45	14.04	21.72	35.77
45	8.37	1.66	0.21	0.03	0.01	0.67	0.37	1.48	0.37	1.53	14.70	22.95	37.65
50	8.74	1.77	0.21	0.03	0.02	0.70	0.38	1.57	0.39	1.62	15.43	24.32	39.75

Table VOC BUS 76
Financial Cost of Operation of Buses on Four Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	6.14	1.09	0.20	0.05	0.00	0.52	0.29	1.00	0.25	1.03	10.56	15.49	26.06
5	6.32	1.13	0.20	0.05	0.00	0.54	0.30	1.04	0.26	1.07	10.92	16.11	27.02
10	6.52	1.18	0.21	0.05	0.00	0.56	0.31	1.08	0.27	1.12	11.30	16.77	28.07
15	6.73	1.24	0.21	0.05	0.00	0.58	0.32	1.13	0.28	1.17	11.71	17.49	29.20
20	6.96	1.30	0.21	0.05	0.01	0.60	0.33	1.18	0.30	1.22	12.15	18.28	30.43
25	7.21	1.37	0.21	0.05	0.01	0.63	0.34	1.23	0.31	1.28	12.64	19.14	31.78
30	7.48	1.44	0.22	0.05	0.01	0.65	0.36	1.30	0.33	1.34	13.17	20.09	33.25
35	7.78	1.53	0.22	0.05	0.01	0.67	0.37	1.36	0.34	1.41	13.74	21.13	34.87
40	8.10	1.62	0.22	0.05	0.01	0.70	0.38	1.44	0.36	1.49	14.37	22.29	36.66
45	8.45	1.73	0.22	0.05	0.01	0.72	0.40	1.52	0.38	1.57	15.07	23.58	38.65
50	8.84	1.85	0.23	0.05	0.02	0.75	0.41	1.61	0.41	1.67	15.84	25.04	40.88

Table VOC BUS 77
Financial Cost of Operation of Buses on Four Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	6.14	1.12	0.22	0.07	0.00	0.56	0.31	1.02	0.26	1.05	10.73	15.78	26.51
5	6.32	1.17	0.22	0.07	0.00	0.58	0.32	1.06	0.27	1.09	11.10	16.42	27.52
10	6.53	1.22	0.22	0.07	0.00	0.60	0.33	1.10	0.28	1.14	11.50	17.11	28.61
15	6.75	1.28	0.23	0.07	0.00	0.62	0.34	1.15	0.29	1.19	11.93	17.86	29.79
20	6.99	1.35	0.23	0.07	0.01	0.65	0.36	1.20	0.30	1.25	12.39	18.68	31.08
25	7.25	1.42	0.23	0.07	0.01	0.67	0.37	1.26	0.32	1.31	12.90	19.58	32.48
30	7.53	1.50	0.23	0.07	0.01	0.70	0.38	1.33	0.33	1.37	13.46	20.57	34.03
35	7.84	1.59	0.24	0.07	0.01	0.72	0.40	1.40	0.35	1.44	14.06	21.67	35.73
40	8.18	1.69	0.24	0.07	0.01	0.75	0.41	1.48	0.37	1.53	14.73	22.89	37.62
45	8.55	1.81	0.24	0.07	0.01	0.78	0.43	1.56	0.39	1.62	15.46	24.25	39.72
50	8.95	1.95	0.24	0.07	0.02	0.81	0.44	1.66	0.42	1.72	16.28	25.79	42.07

Table VOC BUS 78
Financial Cost of Operation of Buses on Four Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	6.14	1.15	0.24	0.09	0.00	0.60	0.33	1.04	0.26	1.07	10.91	16.08	26.99
5	6.33	1.20	0.24	0.09	0.00	0.62	0.34	1.08	0.27	1.12	11.29	16.74	28.03
10	6.54	1.26	0.24	0.09	0.00	0.65	0.36	1.13	0.28	1.16	11.71	17.46	29.17
15	6.77	1.32	0.24	0.09	0.00	0.67	0.37	1.18	0.30	1.22	12.16	18.24	30.40
20	7.02	1.39	0.25	0.09	0.01	0.70	0.38	1.23	0.31	1.27	12.65	19.10	31.75
25	7.29	1.47	0.25	0.09	0.01	0.72	0.40	1.29	0.32	1.34	13.18	20.04	33.22
30	7.59	1.56	0.25	0.09	0.01	0.75	0.41	1.36	0.34	1.41	13.77	21.08	34.85
35	7.91	1.66	0.25	0.09	0.01	0.78	0.43	1.43	0.36	1.48	14.40	22.23	36.64
40	8.26	1.77	0.26	0.09	0.01	0.81	0.44	1.52	0.38	1.57	15.11	23.52	38.63
45	8.65	1.90	0.26	0.09	0.01	0.84	0.46	1.61	0.40	1.66	15.89	24.96	40.85
50	9.07	2.05	0.26	0.09	0.02	0.87	0.48	1.72	0.43	1.77	16.76	26.60	43.35

Table VOC BUS 79
Financial Cost of Operation of Buses on Four Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	6.14	1.18	0.25	0.11	0.00	0.65	0.36	1.06	0.27	1.09	11.10	16.39	27.49
5	6.34	1.24	0.26	0.11	0.00	0.67	0.37	1.10	0.28	1.14	11.50	17.08	28.58
10	6.56	1.30	0.26	0.11	0.00	0.70	0.38	1.15	0.29	1.19	11.94	17.82	29.76
15	6.80	1.37	0.26	0.11	0.00	0.72	0.40	1.20	0.30	1.24	12.41	18.64	31.05
20	7.06	1.45	0.26	0.11	0.01	0.75	0.41	1.26	0.32	1.30	12.92	19.54	32.46
25	7.34	1.53	0.27	0.11	0.01	0.78	0.43	1.32	0.33	1.37	13.48	20.52	34.01
30	7.65	1.63	0.27	0.11	0.01	0.81	0.44	1.39	0.35	1.44	14.10	21.61	35.71
35	7.99	1.73	0.27	0.11	0.01	0.84	0.46	1.47	0.37	1.52	14.77	22.83	37.60
40	8.35	1.86	0.27	0.11	0.01	0.87	0.48	1.56	0.39	1.61	15.51	24.19	39.70
45	8.76	2.00	0.28	0.11	0.01	0.90	0.49	1.66	0.42	1.71	16.34	25.72	42.06
50	9.21	2.16	0.28	0.11	0.02	0.93	0.51	1.77	0.44	1.83	17.27	27.45	44.72

Table VOC BUS 80
Financial Cost of Operation of Buses on Four Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	6.15	1.22	0.27	0.13	0.00	0.69	0.38	1.08	0.27	1.11	11.30	16.71	28.01
5	6.36	1.28	0.27	0.13	0.00	0.72	0.40	1.12	0.28	1.16	11.72	17.42	29.15
10	6.59	1.35	0.28	0.13	0.00	0.75	0.41	1.17	0.30	1.21	12.18	18.20	30.39
15	6.83	1.42	0.28	0.13	0.00	0.78	0.43	1.23	0.31	1.27	12.68	19.06	31.73
20	7.10	1.50	0.28	0.13	0.01	0.80	0.44	1.29	0.32	1.33	13.22	20.00	33.21
25	7.40	1.59	0.28	0.13	0.01	0.83	0.46	1.36	0.34	1.40	13.80	21.03	34.83
30	7.72	1.70	0.29	0.13	0.01	0.87	0.48	1.43	0.36	1.48	14.45	22.18	36.63
35	8.07	1.82	0.29	0.13	0.01	0.90	0.49	1.51	0.38	1.56	15.16	23.46	38.62
40	8.45	1.95	0.29	0.13	0.01	0.93	0.51	1.61	0.40	1.66	15.95	24.89	40.84
45	8.88	2.11	0.29	0.13	0.01	0.97	0.53	1.71	0.43	1.77	16.83	26.52	43.34
50	9.35	2.29	0.30	0.13	0.02	1.00	0.55	1.83	0.46	1.89	17.82	28.37	46.18

Table VOC BUS 81
Financial Cost of Operation of Buses on Four Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	6.16	1.26	0.29	0.14	0.00	0.75	0.41	1.10	0.28	1.14	11.52	17.04	28.56
5	6.38	1.33	0.29	0.15	0.00	0.77	0.43	1.15	0.29	1.19	11.96	17.79	29.75
10	6.61	1.40	0.29	0.15	0.00	0.80	0.44	1.20	0.30	1.24	12.44	18.60	31.04
15	6.87	1.48	0.30	0.15	0.00	0.83	0.46	1.26	0.32	1.30	12.96	19.49	32.45
20	7.15	1.56	0.30	0.15	0.01	0.86	0.48	1.32	0.33	1.37	13.53	20.48	34.00
25	7.46	1.66	0.30	0.15	0.01	0.90	0.49	1.39	0.35	1.44	14.15	21.56	35.71
30	7.79	1.78	0.30	0.15	0.01	0.93	0.51	1.47	0.37	1.52	14.83	22.77	37.60
35	8.16	1.90	0.31	0.15	0.01	0.97	0.53	1.56	0.39	1.61	15.58	24.12	39.70
40	8.56	2.05	0.31	0.15	0.01	1.00	0.55	1.65	0.42	1.71	16.42	25.64	42.06
45	9.01	2.23	0.31	0.15	0.01	1.04	0.57	1.76	0.44	1.82	17.35	27.37	44.72
50	9.50	2.44	0.31	0.15	0.02	1.08	0.59	1.89	0.48	1.96	18.42	29.34	47.76

Table VOC BUS 82
Financial Cost of Operation of Buses on Four Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Passenger Cost	Grand Total
0	6.17	1.30	0.31	0.16	0.00	0.80	0.44	1.12	0.28	1.16	11.75	17.39	29.14
5	6.40	1.37	0.31	0.16	0.00	0.83	0.46	1.17	0.29	1.21	12.21	18.17	30.38
10	6.65	1.45	0.31	0.16	0.00	0.86	0.47	1.23	0.31	1.27	12.72	19.02	31.73
15	6.92	1.53	0.31	0.17	0.00	0.90	0.49	1.29	0.32	1.33	13.26	19.95	33.21
20	7.21	1.63	0.32	0.17	0.01	0.93	0.51	1.35	0.34	1.40	13.86	20.98	34.84
25	7.53	1.74	0.32	0.17	0.01	0.96	0.53	1.43	0.36	1.47	14.51	22.12	36.63
30	7.88	1.86	0.32	0.17	0.01	1.00	0.55	1.51	0.38	1.56	15.23	23.39	38.63
35	8.26	2.00	0.32	0.17	0.01	1.04	0.57	1.60	0.40	1.65	16.03	24.82	40.85
40	8.68	2.17	0.33	0.17	0.01	1.08	0.59	1.70	0.43	1.76	16.92	26.44	43.36
45	9.15	2.37	0.33	0.17	0.01	1.12	0.61	1.82	0.46	1.88	17.92	28.27	46.20
50	9.67	2.60	0.33	0.17	0.02	1.16	0.64	1.96	0.49	2.03	19.07	30.39	49.45

VOC Tables for Light Commercial Vehicles

(Clause 6.9)

Table VOC LCV 1
Economic Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.14	0.52	0.07	0.03	0.00	0.26	0.10	2.87	0.48	2.05	8.51	0.26	8.81
5	2.49	0.55	0.07	0.03	0.01	0.26	0.10	2.97	0.50	2.13	9.09	0.27	9.40
10	2.84	0.59	0.08	0.03	0.01	0.26	0.10	3.08	0.52	2.21	9.70	0.28	10.01
15	3.20	0.62	0.09	0.03	0.01	0.26	0.10	3.21	0.54	2.29	10.33	0.29	10.66
20	3.57	0.67	0.09	0.03	0.01	0.26	0.10	3.34	0.56	2.39	11.00	0.30	11.34
25	3.94	0.72	0.10	0.03	0.01	0.26	0.10	3.48	0.58	2.49	11.70	0.31	12.05
30	4.33	0.78	0.11	0.03	0.01	0.26	0.10	3.64	0.61	2.60	12.44	0.33	12.81
35	4.72	0.84	0.12	0.03	0.01	0.26	0.10	3.81	0.64	2.72	13.24	0.34	13.62
40	5.13	0.92	0.12	0.03	0.01	0.26	0.10	3.99	0.67	2.86	14.08	0.36	14.48
45	5.55	1.02	0.13	0.03	0.01	0.26	0.10	4.20	0.70	3.00	15.00	0.38	15.42
50	5.99	1.14	0.14	0.03	0.01	0.26	0.10	4.43	0.74	3.17	15.99	0.40	16.43

Table VOC LCV 2
Economic Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.14	0.54	0.07	0.03	0.01	0.30	0.11	2.91	0.49	2.08	8.66	0.26	8.97
5	2.49	0.57	0.08	0.03	0.01	0.30	0.11	3.01	0.50	2.16	9.25	0.27	9.57
10	2.84	0.61	0.08	0.03	0.01	0.30	0.11	3.13	0.52	2.24	9.87	0.28	10.20
15	3.21	0.65	0.09	0.03	0.01	0.30	0.11	3.26	0.54	2.33	10.52	0.29	10.85
20	3.58	0.69	0.10	0.03	0.01	0.30	0.11	3.39	0.57	2.43	11.20	0.30	11.55
25	3.96	0.75	0.10	0.03	0.01	0.30	0.11	3.54	0.59	2.53	11.92	0.32	12.28
30	4.35	0.81	0.11	0.03	0.01	0.30	0.11	3.70	0.62	2.65	12.68	0.33	13.06
35	4.75	0.89	0.12	0.03	0.01	0.30	0.11	3.88	0.65	2.77	13.50	0.35	13.89
40	5.16	0.98	0.13	0.03	0.01	0.30	0.11	4.07	0.68	2.91	14.37	0.36	14.78
45	5.59	1.08	0.13	0.03	0.01	0.30	0.11	4.29	0.72	3.07	15.32	0.38	15.75
50	6.03	1.22	0.14	0.03	0.01	0.30	0.11	4.52	0.76	3.24	16.36	0.40	16.81

Table VOC LCV 3
Economic Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.14	0.56	0.07	0.03	0.01	0.34	0.13	2.95	0.49	2.11	8.82	0.26	9.14
5	2.49	0.59	0.08	0.03	0.01	0.34	0.13	3.06	0.51	2.19	9.42	0.27	9.75
10	2.85	0.63	0.09	0.03	0.01	0.34	0.13	3.18	0.53	2.27	10.05	0.28	10.39
15	3.22	0.67	0.09	0.03	0.01	0.34	0.13	3.31	0.55	2.37	10.72	0.30	11.07
20	3.59	0.72	0.10	0.03	0.01	0.34	0.13	3.45	0.58	2.47	11.41	0.31	11.78
25	3.98	0.78	0.11	0.03	0.01	0.34	0.13	3.60	0.60	2.58	12.15	0.32	12.53
30	4.37	0.85	0.11	0.03	0.01	0.34	0.13	3.77	0.63	2.70	12.94	0.34	13.33
35	4.77	0.93	0.12	0.03	0.01	0.34	0.13	3.95	0.66	2.83	13.78	0.35	14.18
40	5.19	1.03	0.13	0.03	0.01	0.34	0.13	4.15	0.69	2.97	14.68	0.37	15.11
45	5.63	1.16	0.14	0.03	0.01	0.34	0.13	4.38	0.73	3.13	15.67	0.39	16.11
50	6.08	1.31	0.14	0.03	0.01	0.34	0.13	4.63	0.77	3.31	16.75	0.41	17.22

Table VOC LCV 4
Economic Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.14	0.57	0.07	0.03	0.01	0.39	0.15	2.99	0.50	2.14	9.00	0.27	9.33
5	2.50	0.61	0.08	0.03	0.01	0.39	0.15	3.11	0.52	2.22	9.61	0.28	9.95
10	2.86	0.65	0.09	0.03	0.01	0.39	0.15	3.23	0.54	2.31	10.26	0.29	10.61
15	3.23	0.70	0.09	0.03	0.01	0.39	0.15	3.36	0.56	2.41	10.93	0.30	11.30
20	3.61	0.75	0.10	0.03	0.01	0.39	0.15	3.51	0.59	2.51	11.65	0.31	12.02
25	3.99	0.82	0.11	0.03	0.01	0.39	0.15	3.67	0.61	2.62	12.40	0.33	12.79
30	4.39	0.89	0.12	0.03	0.01	0.39	0.15	3.84	0.64	2.75	13.21	0.34	13.62
35	4.80	0.99	0.12	0.03	0.01	0.39	0.15	4.03	0.67	2.88	14.08	0.36	14.50
40	5.23	1.10	0.13	0.03	0.01	0.39	0.15	4.24	0.71	3.03	15.02	0.38	15.46
45	5.67	1.24	0.14	0.03	0.01	0.39	0.15	4.47	0.75	3.20	16.04	0.40	16.51
50	6.12	1.42	0.15	0.03	0.02	0.39	0.15	4.73	0.79	3.39	17.18	0.42	17.67

Table VOC LCV 5
Economic Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.15	0.59	0.08	0.03	0.01	0.45	0.17	3.04	0.51	2.17	9.19	0.27	9.54
5	2.50	0.63	0.08	0.03	0.01	0.45	0.17	3.15	0.53	2.26	9.82	0.28	10.17
10	2.87	0.68	0.09	0.03	0.01	0.45	0.17	3.28	0.55	2.35	10.47	0.29	10.84
15	3.24	0.73	0.10	0.03	0.01	0.45	0.17	3.42	0.57	2.45	11.17	0.31	11.54
20	3.62	0.79	0.10	0.03	0.01	0.45	0.17	3.57	0.60	2.55	11.90	0.32	12.29
25	4.01	0.86	0.11	0.03	0.01	0.45	0.17	3.73	0.62	2.67	12.68	0.33	13.08
30	4.42	0.94	0.12	0.03	0.01	0.45	0.17	3.91	0.65	2.80	13.51	0.35	13.93
35	4.83	1.04	0.13	0.03	0.01	0.45	0.17	4.11	0.69	2.94	14.41	0.37	14.85
40	5.26	1.17	0.13	0.03	0.01	0.45	0.17	4.33	0.72	3.10	15.38	0.39	15.84
45	5.71	1.33	0.14	0.03	0.02	0.45	0.17	4.57	0.76	3.27	16.46	0.41	16.94
50	6.18	1.55	0.15	0.03	0.02	0.45	0.17	4.84	0.81	3.46	17.66	0.43	18.16

Table VOC LCV 6
Economic Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.15	0.62	0.08	0.03	0.01	0.52	0.19	3.08	0.51	2.20	9.40	0.28	9.76
5	2.51	0.66	0.09	0.03	0.01	0.52	0.19	3.20	0.53	2.29	10.04	0.29	10.41
10	2.88	0.71	0.09	0.03	0.01	0.52	0.19	3.33	0.56	2.38	10.71	0.30	11.09
15	3.25	0.76	0.10	0.03	0.01	0.52	0.19	3.48	0.58	2.49	11.42	0.31	11.81
20	3.64	0.83	0.11	0.03	0.01	0.52	0.19	3.63	0.61	2.60	12.17	0.32	12.58
25	4.04	0.90	0.11	0.03	0.01	0.52	0.19	3.80	0.64	2.72	12.97	0.34	13.39
30	4.44	1.00	0.12	0.03	0.01	0.52	0.19	3.99	0.67	2.85	13.83	0.36	14.27
35	4.86	1.11	0.13	0.03	0.02	0.52	0.19	4.19	0.70	3.00	14.76	0.37	15.22
40	5.30	1.26	0.14	0.03	0.02	0.52	0.19	4.42	0.74	3.16	15.78	0.40	16.26
45	5.75	1.44	0.14	0.03	0.02	0.52	0.19	4.68	0.78	3.34	16.91	0.42	17.41
50	6.23	1.70	0.15	0.03	0.02	0.52	0.19	4.96	0.83	3.55	18.18	0.44	18.71

Table VOC LCV 7
Economic Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.16	0.64	0.08	0.03	0.01	0.60	0.22	3.13	0.52	2.24	9.63	0.28	10.01
5	2.52	0.68	0.09	0.03	0.01	0.60	0.22	3.25	0.54	2.33	10.28	0.29	10.67
10	2.89	0.73	0.10	0.03	0.01	0.60	0.22	3.39	0.57	2.42	10.97	0.30	11.37
15	3.27	0.80	0.10	0.03	0.01	0.60	0.22	3.54	0.59	2.53	11.69	0.32	12.11
20	3.66	0.87	0.11	0.03	0.01	0.60	0.22	3.70	0.62	2.64	12.47	0.33	12.89
25	4.06	0.95	0.12	0.03	0.02	0.60	0.22	3.87	0.65	2.77	13.29	0.35	13.73
30	4.47	1.06	0.12	0.03	0.02	0.60	0.22	4.07	0.68	2.91	14.18	0.36	14.64
35	4.90	1.19	0.13	0.03	0.02	0.60	0.22	4.28	0.72	3.06	15.15	0.38	15.63
40	5.34	1.35	0.14	0.03	0.02	0.60	0.22	4.52	0.75	3.23	16.21	0.40	16.71
45	5.80	1.57	0.15	0.03	0.02	0.60	0.22	4.79	0.80	3.42	17.41	0.43	17.93
50	6.29	1.88	0.15	0.03	0.02	0.60	0.22	5.08	0.85	3.64	18.77	0.45	19.32

Table VOC LCV 8
Economic Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.16	0.66	0.08	0.04	0.01	0.69	0.26	3.18	0.53	2.27	9.88	0.28	10.28
5	2.53	0.71	0.09	0.04	0.01	0.69	0.26	3.31	0.55	2.36	10.55	0.30	10.96
10	2.90	0.77	0.10	0.04	0.01	0.69	0.26	3.45	0.58	2.46	11.25	0.31	11.67
15	3.29	0.83	0.11	0.04	0.02	0.69	0.26	3.60	0.60	2.57	12.00	0.32	12.43
20	3.68	0.91	0.11	0.04	0.02	0.69	0.26	3.77	0.63	2.69	12.79	0.34	13.24
25	4.08	1.01	0.12	0.04	0.02	0.69	0.26	3.95	0.66	2.82	13.64	0.35	14.11
30	4.50	1.12	0.13	0.04	0.02	0.69	0.26	4.15	0.69	2.97	14.56	0.37	15.05
35	4.94	1.27	0.13	0.04	0.02	0.69	0.26	4.37	0.73	3.13	15.57	0.39	16.08
40	5.39	1.47	0.14	0.04	0.02	0.69	0.26	4.62	0.77	3.30	16.69	0.41	17.22
45	5.86	1.73	0.15	0.04	0.02	0.69	0.26	4.90	0.82	3.50	17.96	0.44	18.51
50	6.35	2.11	0.16	0.04	0.02	0.69	0.26	5.21	0.87	3.73	19.43	0.47	20.01

Table VOC LCV 9
Economic Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.17	0.69	0.09	0.04	0.01	0.80	0.29	3.23	0.54	2.31	10.16	0.29	10.58
5	2.54	0.74	0.09	0.04	0.02	0.80	0.29	3.36	0.56	2.40	10.84	0.30	11.27
10	2.92	0.80	0.10	0.04	0.02	0.80	0.29	3.50	0.59	2.51	11.56	0.31	12.00
15	3.30	0.88	0.11	0.04	0.02	0.80	0.29	3.66	0.61	2.62	12.32	0.33	12.78
20	3.70	0.96	0.12	0.04	0.02	0.80	0.29	3.84	0.64	2.74	13.14	0.34	13.61
25	4.11	1.07	0.12	0.04	0.02	0.80	0.29	4.03	0.67	2.88	14.03	0.36	14.51
30	4.54	1.20	0.13	0.04	0.02	0.80	0.29	4.23	0.71	3.03	14.98	0.38	15.49
35	4.97	1.37	0.14	0.04	0.02	0.80	0.29	4.47	0.75	3.20	16.04	0.40	16.57
40	5.43	1.60	0.14	0.04	0.02	0.80	0.29	4.73	0.79	3.38	17.22	0.42	17.77
45	5.91	1.92	0.15	0.04	0.02	0.80	0.29	5.02	0.84	3.59	18.58	0.45	19.16
50	6.42	2.40	0.16	0.04	0.02	0.80	0.29	5.35	0.89	3.83	20.20	0.48	20.80

Table VOC LCV 10
Economic Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 11000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.18	0.72	0.09	0.04	0.02	0.92	0.34	3.28	0.55	2.34	10.46	0.29	10.90
5	2.55	0.77	0.10	0.04	0.02	0.92	0.34	3.42	0.57	2.44	11.16	0.31	11.61
10	2.93	0.84	0.10	0.04	0.02	0.92	0.34	3.57	0.60	2.55	11.90	0.32	12.37
15	3.32	0.92	0.11	0.04	0.02	0.92	0.34	3.73	0.62	2.67	12.69	0.33	13.17
20	3.73	1.02	0.12	0.04	0.02	0.92	0.34	3.91	0.65	2.80	13.53	0.35	14.03
25	4.14	1.14	0.13	0.04	0.02	0.92	0.34	4.11	0.69	2.94	14.45	0.37	14.96
30	4.57	1.29	0.13	0.04	0.02	0.92	0.34	4.32	0.72	3.09	15.45	0.39	15.98
35	5.02	1.49	0.14	0.04	0.02	0.92	0.34	4.57	0.76	3.27	16.56	0.41	17.11
40	5.48	1.76	0.15	0.04	0.02	0.92	0.34	4.84	0.81	3.46	17.82	0.43	18.40
45	5.98	2.16	0.15	0.04	0.02	0.92	0.34	5.14	0.86	3.68	19.29	0.46	19.89
50	6.50	2.78	0.16	0.04	0.02	0.92	0.34	5.49	0.92	3.93	21.09	0.49	21.73

Table VOC LCV 11
Economic Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 12000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.19	0.75	0.09	0.04	0.02	1.06	0.39	3.33	0.56	2.38	10.80	0.30	11.27
5	2.56	0.81	0.10	0.04	0.02	1.06	0.39	3.47	0.58	2.48	11.51	0.31	11.99
10	2.95	0.88	0.11	0.04	0.02	1.06	0.39	3.63	0.61	2.60	12.27	0.32	12.77
15	3.35	0.97	0.11	0.04	0.02	1.06	0.39	3.80	0.63	2.72	13.08	0.34	13.59
20	3.75	1.08	0.12	0.04	0.02	1.06	0.39	3.98	0.67	2.85	13.96	0.36	14.48
25	4.17	1.22	0.13	0.04	0.02	1.06	0.39	4.19	0.70	3.00	14.91	0.37	15.45
30	4.61	1.39	0.13	0.04	0.02	1.06	0.39	4.42	0.74	3.16	15.96	0.39	16.52
35	5.06	1.63	0.14	0.04	0.02	1.06	0.39	4.67	0.78	3.34	17.13	0.42	17.72
40	5.54	1.96	0.15	0.04	0.02	1.06	0.39	4.96	0.83	3.54	18.48	0.44	19.10
45	6.04	2.46	0.16	0.04	0.02	1.06	0.39	5.28	0.88	3.77	20.10	0.47	20.74
50	6.58	3.30	0.16	0.04	0.02	1.06	0.39	5.64	0.94	4.04	22.18	0.50	22.85

Table VOC LCV 12
Economic Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 13000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.20	0.78	0.09	0.04	0.02	1.22	0.45	3.39	0.57	2.42	11.17	0.30	11.67
5	2.58	0.85	0.10	0.04	0.02	1.22	0.45	3.53	0.59	2.53	11.90	0.32	12.42
10	2.97	0.93	0.11	0.04	0.02	1.22	0.45	3.69	0.62	2.64	12.69	0.33	13.21
15	3.37	1.03	0.12	0.04	0.02	1.22	0.45	3.87	0.65	2.77	13.52	0.35	14.07
20	3.78	1.15	0.12	0.04	0.02	1.22	0.45	4.06	0.68	2.91	14.43	0.36	14.99
25	4.21	1.31	0.13	0.04	0.02	1.22	0.45	4.28	0.71	3.06	15.42	0.38	16.00
30	4.65	1.51	0.14	0.04	0.02	1.22	0.45	4.51	0.75	3.23	16.53	0.40	17.13
35	5.11	1.80	0.14	0.04	0.02	1.22	0.45	4.78	0.80	3.42	17.78	0.43	18.40
40	5.60	2.21	0.15	0.04	0.02	1.22	0.45	5.08	0.85	3.63	19.25	0.45	19.89
45	6.12	2.86	0.16	0.04	0.02	1.22	0.45	5.42	0.90	3.87	21.06	0.48	21.74
50	6.67	4.07	0.17	0.04	0.03	1.22	0.45	5.80	0.97	4.15	23.56	0.52	24.28

Table VOC LCV 13
Economic Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 14000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.21	0.82	0.10	0.04	0.02	1.40	0.52	3.44	0.58	2.46	11.58	0.31	12.12
5	2.60	0.89	0.10	0.04	0.02	1.40	0.52	3.60	0.60	2.57	12.34	0.32	12.88
10	2.99	0.98	0.11	0.04	0.02	1.40	0.52	3.76	0.63	2.69	13.14	0.34	13.70
15	3.39	1.09	0.12	0.04	0.02	1.40	0.52	3.94	0.66	2.82	14.01	0.35	14.59
20	3.81	1.23	0.13	0.04	0.02	1.40	0.52	4.14	0.69	2.96	14.96	0.37	15.55
25	4.24	1.42	0.13	0.04	0.02	1.40	0.52	4.37	0.73	3.12	16.00	0.39	16.61
30	4.69	1.66	0.14	0.04	0.02	1.40	0.52	4.62	0.77	3.30	17.16	0.41	17.80
35	5.17	2.00	0.15	0.04	0.02	1.40	0.52	4.89	0.82	3.50	18.51	0.44	19.17
40	5.66	2.53	0.15	0.04	0.02	1.40	0.52	5.21	0.87	3.72	20.13	0.47	20.82
45	6.19	3.42	0.16	0.04	0.03	1.40	0.52	5.56	0.93	3.98	22.23	0.50	22.96
50	6.77	5.31	0.17	0.04	0.03	1.40	0.52	5.97	1.00	4.27	25.47	0.53	26.23

Table VOC LCV 14
Economic Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 15000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.23	0.86	0.10	0.04	0.02	1.61	0.60	3.50	0.58	2.50	12.05	0.31	12.62
5	2.61	0.94	0.11	0.04	0.02	1.61	0.60	3.66	0.61	2.62	12.82	0.33	13.41
10	3.01	1.04	0.11	0.04	0.02	1.61	0.60	3.83	0.64	2.74	13.65	0.34	14.25
15	3.42	1.17	0.12	0.04	0.02	1.61	0.60	4.02	0.67	2.88	14.55	0.36	15.17
20	3.85	1.33	0.13	0.04	0.02	1.61	0.60	4.23	0.71	3.03	15.54	0.38	16.18
25	4.28	1.54	0.14	0.04	0.02	1.61	0.60	4.46	0.75	3.19	16.63	0.40	17.29
30	4.74	1.83	0.14	0.04	0.02	1.61	0.60	4.72	0.79	3.38	17.88	0.42	18.56
35	5.22	2.26	0.15	0.04	0.03	1.61	0.60	5.01	0.84	3.58	19.35	0.45	20.05
40	5.73	2.95	0.16	0.04	0.03	1.61	0.60	5.34	0.89	3.82	21.18	0.48	21.91
45	6.28	4.26	0.16	0.04	0.03	1.61	0.60	5.72	0.95	4.09	23.74	0.51	24.51
50	6.88	7.62	0.17	0.04	0.03	1.61	0.60	6.15	1.03	4.40	28.53	0.55	29.34

Table VOC LCV 15
Economic Cost of Operation of Light Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.28	0.44	0.06	0.03	0.00	0.19	0.07	2.70	0.45	1.93	8.16	0.24	8.43
5	2.60	0.46	0.07	0.03	0.01	0.19	0.07	2.80	0.47	2.00	8.70	0.25	8.99
10	2.94	0.48	0.08	0.03	0.01	0.19	0.07	2.91	0.49	2.08	9.27	0.26	9.56
15	3.28	0.51	0.09	0.03	0.01	0.19	0.07	3.03	0.51	2.17	9.87	0.27	10.17
20	3.63	0.54	0.09	0.03	0.01	0.19	0.07	3.15	0.53	2.26	10.50	0.28	10.81
25	4.00	0.57	0.10	0.03	0.01	0.19	0.07	3.29	0.55	2.35	11.15	0.29	11.48
30	4.37	0.60	0.11	0.03	0.01	0.19	0.07	3.44	0.57	2.46	11.85	0.31	12.19
35	4.75	0.64	0.11	0.03	0.01	0.19	0.07	3.61	0.60	2.58	12.59	0.32	12.94
40	5.14	0.69	0.12	0.03	0.01	0.19	0.07	3.79	0.63	2.71	13.38	0.34	13.75
45	5.55	0.74	0.13	0.03	0.01	0.19	0.07	3.99	0.67	2.85	14.22	0.36	14.61
50	5.97	0.80	0.14	0.03	0.01	0.19	0.07	4.21	0.70	3.01	15.13	0.38	15.54

Table VOC LCV 16
Economic Cost of Operation of Light Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.27	0.45	0.07	0.03	0.01	0.22	0.08	2.74	0.46	1.96	8.28	0.25	8.56
5	2.60	0.47	0.07	0.03	0.01	0.22	0.08	2.84	0.48	2.03	8.84	0.25	9.12
10	2.94	0.50	0.08	0.03	0.01	0.22	0.08	2.96	0.49	2.11	9.42	0.26	9.72
15	3.29	0.52	0.09	0.03	0.01	0.22	0.08	3.08	0.51	2.20	10.02	0.28	10.33
20	3.64	0.55	0.09	0.03	0.01	0.22	0.08	3.21	0.54	2.29	10.66	0.29	10.98
25	4.00	0.59	0.10	0.03	0.01	0.22	0.08	3.35	0.56	2.40	11.34	0.30	11.67
30	4.38	0.62	0.11	0.03	0.01	0.22	0.08	3.50	0.59	2.51	12.05	0.31	12.40
35	4.77	0.67	0.12	0.03	0.01	0.22	0.08	3.68	0.61	2.63	12.81	0.33	13.17
40	5.16	0.72	0.12	0.03	0.01	0.22	0.08	3.86	0.65	2.76	13.62	0.35	14.00
45	5.58	0.77	0.13	0.03	0.01	0.22	0.08	4.07	0.68	2.91	14.49	0.36	14.89
50	6.00	0.84	0.14	0.03	0.01	0.22	0.08	4.30	0.72	3.08	15.43	0.38	15.85

Table VOC LCV 17
Economic Cost of Operation of Light Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.26	0.46	0.07	0.03	0.01	0.25	0.09	2.78	0.46	1.99	8.41	0.25	8.70
5	2.60	0.48	0.07	0.03	0.01	0.25	0.09	2.89	0.48	2.07	8.98	0.26	9.28
10	2.94	0.51	0.08	0.03	0.01	0.25	0.09	3.00	0.50	2.15	9.57	0.27	9.88
15	3.29	0.54	0.09	0.03	0.01	0.25	0.09	3.13	0.52	2.24	10.19	0.28	10.51
20	3.65	0.57	0.10	0.03	0.01	0.25	0.09	3.26	0.54	2.33	10.84	0.29	11.17
25	4.02	0.61	0.10	0.03	0.01	0.25	0.09	3.41	0.57	2.44	11.53	0.30	11.88
30	4.39	0.65	0.11	0.03	0.01	0.25	0.09	3.57	0.60	2.55	12.26	0.32	12.62
35	4.79	0.69	0.12	0.03	0.01	0.25	0.09	3.75	0.63	2.68	13.04	0.34	13.42
40	5.19	0.75	0.13	0.03	0.01	0.25	0.09	3.94	0.66	2.82	13.87	0.35	14.27
45	5.61	0.81	0.13	0.03	0.01	0.25	0.09	4.16	0.69	2.98	14.77	0.37	15.18
50	6.04	0.89	0.14	0.03	0.01	0.25	0.09	4.40	0.74	3.15	15.75	0.39	16.18

Table VOC LCV 18
Economic Cost of Operation of Light Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.26	0.47	0.07	0.03	0.01	0.29	0.11	2.82	0.47	2.02	8.55	0.25	8.85
5	2.59	0.50	0.08	0.03	0.01	0.29	0.11	2.93	0.49	2.10	9.13	0.26	9.44
10	2.94	0.53	0.08	0.03	0.01	0.29	0.11	3.05	0.51	2.18	9.73	0.27	10.05
15	3.29	0.56	0.09	0.03	0.01	0.29	0.11	3.18	0.53	2.27	10.37	0.28	10.70
20	3.66	0.59	0.10	0.03	0.01	0.29	0.11	3.32	0.55	2.37	11.03	0.30	11.38
25	4.03	0.63	0.11	0.03	0.01	0.29	0.11	3.47	0.58	2.48	11.74	0.31	12.10
30	4.41	0.67	0.11	0.03	0.01	0.29	0.11	3.64	0.61	2.60	12.49	0.33	12.86
35	4.81	0.72	0.12	0.03	0.01	0.29	0.11	3.82	0.64	2.73	13.29	0.34	13.68
40	5.22	0.78	0.13	0.03	0.01	0.29	0.11	4.03	0.67	2.88	14.15	0.36	14.56
45	5.64	0.85	0.13	0.03	0.01	0.29	0.11	4.25	0.71	3.04	15.08	0.38	15.50
50	6.08	0.93	0.14	0.03	0.02	0.29	0.11	4.51	0.75	3.22	16.09	0.40	16.54

Table VOC LCV 19
Economic Cost of Operation of Light Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.25	0.49	0.07	0.03	0.01	0.34	0.12	2.87	0.48	2.05	8.71	0.26	9.02
5	2.59	0.51	0.08	0.03	0.01	0.34	0.12	2.98	0.50	2.13	9.29	0.27	9.61
10	2.94	0.54	0.09	0.03	0.01	0.34	0.12	3.10	0.52	2.22	9.91	0.28	10.24
15	3.30	0.57	0.09	0.03	0.01	0.34	0.12	3.23	0.54	2.31	10.56	0.29	10.90
20	3.67	0.61	0.10	0.03	0.01	0.34	0.12	3.38	0.56	2.42	11.24	0.30	11.60
25	4.04	0.65	0.11	0.03	0.01	0.34	0.12	3.54	0.59	2.53	11.96	0.32	12.33
30	4.43	0.70	0.11	0.03	0.01	0.34	0.12	3.71	0.62	2.65	12.73	0.33	13.12
35	4.83	0.75	0.12	0.03	0.01	0.34	0.12	3.90	0.65	2.79	13.56	0.35	13.96
40	5.25	0.82	0.13	0.03	0.01	0.34	0.12	4.11	0.69	2.94	14.44	0.37	14.87
45	5.68	0.89	0.14	0.03	0.02	0.34	0.12	4.35	0.73	3.11	15.41	0.39	15.85
50	6.13	0.98	0.14	0.03	0.02	0.34	0.12	4.62	0.77	3.30	16.46	0.41	16.92

Table VOC LCV 20
Economic Cost of Operation of Light Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.25	0.50	0.07	0.03	0.01	0.39	0.14	2.91	0.49	2.08	8.88	0.26	9.20
5	2.59	0.53	0.08	0.03	0.01	0.39	0.14	3.03	0.51	2.16	9.47	0.27	9.81
10	2.95	0.56	0.09	0.03	0.01	0.39	0.14	3.15	0.53	2.25	10.10	0.28	10.45
15	3.31	0.59	0.09	0.03	0.01	0.39	0.14	3.29	0.55	2.35	10.76	0.29	11.12
20	3.68	0.63	0.10	0.03	0.01	0.39	0.14	3.44	0.57	2.46	11.46	0.31	11.83
25	4.06	0.68	0.11	0.03	0.01	0.39	0.14	3.60	0.60	2.58	12.20	0.32	12.59
30	4.45	0.73	0.12	0.03	0.01	0.39	0.14	3.78	0.63	2.71	13.00	0.34	13.40
35	4.86	0.79	0.12	0.03	0.02	0.39	0.14	3.98	0.67	2.85	13.84	0.36	14.26
40	5.28	0.86	0.13	0.03	0.02	0.39	0.14	4.20	0.70	3.01	14.76	0.38	15.20
45	5.72	0.94	0.14	0.03	0.02	0.39	0.14	4.45	0.74	3.18	15.76	0.40	16.22
50	6.18	1.04	0.15	0.03	0.02	0.39	0.14	4.73	0.79	3.38	16.86	0.42	17.34

Table VOC LCV 21
Economic Cost of Operation of Light Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.25	0.52	0.07	0.03	0.01	0.45	0.16	2.95	0.49	2.11	9.06	0.26	9.39
5	2.60	0.55	0.08	0.03	0.01	0.45	0.16	3.07	0.51	2.20	9.67	0.27	10.01
10	2.95	0.58	0.09	0.03	0.01	0.45	0.16	3.20	0.54	2.29	10.31	0.29	10.67
15	3.32	0.61	0.10	0.03	0.01	0.45	0.16	3.35	0.56	2.39	10.99	0.30	11.36
20	3.69	0.66	0.10	0.03	0.01	0.45	0.16	3.50	0.58	2.50	11.70	0.31	12.09
25	4.08	0.70	0.11	0.03	0.02	0.45	0.16	3.67	0.61	2.63	12.46	0.33	12.86
30	4.47	0.76	0.12	0.03	0.02	0.45	0.16	3.86	0.64	2.76	13.28	0.35	13.70
35	4.89	0.83	0.13	0.03	0.02	0.45	0.16	4.07	0.68	2.91	14.16	0.36	14.59
40	5.31	0.90	0.13	0.03	0.02	0.45	0.16	4.30	0.72	3.07	15.10	0.38	15.56
45	5.76	1.00	0.14	0.03	0.02	0.45	0.16	4.56	0.76	3.26	16.14	0.41	16.62
50	6.23	1.11	0.15	0.03	0.02	0.45	0.16	4.85	0.81	3.47	17.29	0.43	17.79

Table VOC LCV 22
Economic Cost of Operation of Light Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.25	0.53	0.08	0.04	0.01	0.51	0.19	3.00	0.50	2.15	9.26	0.27	9.61
5	2.60	0.56	0.08	0.04	0.01	0.51	0.19	3.12	0.52	2.23	9.88	0.28	10.24
10	2.96	0.60	0.09	0.04	0.01	0.51	0.19	3.26	0.54	2.33	10.54	0.29	10.91
15	3.33	0.64	0.10	0.04	0.02	0.51	0.19	3.41	0.57	2.44	11.23	0.30	11.62
20	3.71	0.68	0.11	0.04	0.02	0.51	0.19	3.57	0.60	2.55	11.96	0.32	12.37
25	4.10	0.73	0.11	0.04	0.02	0.51	0.19	3.74	0.63	2.68	12.75	0.33	13.16
30	4.50	0.79	0.12	0.04	0.02	0.51	0.19	3.94	0.66	2.82	13.59	0.35	14.02
35	4.92	0.87	0.13	0.04	0.02	0.51	0.19	4.16	0.69	2.97	14.49	0.37	14.95
40	5.35	0.95	0.13	0.04	0.02	0.51	0.19	4.40	0.73	3.15	15.48	0.39	15.95
45	5.81	1.06	0.14	0.04	0.02	0.51	0.19	4.67	0.78	3.34	16.56	0.42	17.06
50	6.29	1.19	0.15	0.04	0.02	0.51	0.19	4.98	0.83	3.56	17.76	0.45	18.28

Table VOC LCV 23
Economic Cost of Operation of Light Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.25	0.55	0.08	0.04	0.01	0.59	0.22	3.05	0.51	2.18	9.48	0.27	9.85
5	2.60	0.58	0.09	0.04	0.02	0.59	0.22	3.18	0.53	2.27	10.11	0.28	10.49
10	2.97	0.62	0.09	0.04	0.02	0.59	0.22	3.32	0.55	2.37	10.78	0.30	11.18
15	3.34	0.66	0.10	0.04	0.02	0.59	0.22	3.47	0.58	2.48	11.49	0.31	11.90
20	3.72	0.71	0.11	0.04	0.02	0.59	0.22	3.64	0.61	2.60	12.25	0.33	12.67
25	4.12	0.77	0.11	0.04	0.02	0.59	0.22	3.82	0.64	2.73	13.05	0.34	13.49
30	4.53	0.83	0.12	0.04	0.02	0.59	0.22	4.02	0.67	2.88	13.92	0.36	14.37
35	4.95	0.91	0.13	0.04	0.02	0.59	0.22	4.25	0.71	3.04	14.86	0.38	15.33
40	5.39	1.01	0.14	0.04	0.02	0.59	0.22	4.50	0.75	3.22	15.88	0.40	16.38
45	5.86	1.12	0.14	0.04	0.02	0.59	0.22	4.79	0.80	3.42	17.01	0.43	17.53
50	6.35	1.27	0.15	0.04	0.02	0.59	0.22	5.11	0.85	3.66	18.27	0.46	18.82

Table VOC LCV 24
Economic Cost of Operation of Light Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.43	0.39	0.06	0.03	0.00	0.17	0.06	2.56	0.43	1.83	7.95	0.25	8.23
5	2.74	0.40	0.07	0.03	0.01	0.17	0.06	2.66	0.44	1.90	8.47	0.26	8.76
10	3.05	0.42	0.08	0.03	0.01	0.17	0.06	2.76	0.46	1.97	9.01	0.27	9.31
15	3.38	0.44	0.08	0.03	0.01	0.17	0.06	2.87	0.48	2.05	9.57	0.28	9.88
20	3.72	0.46	0.09	0.03	0.01	0.17	0.06	2.99	0.50	2.14	10.17	0.30	10.49
25	4.06	0.48	0.10	0.03	0.01	0.17	0.06	3.13	0.52	2.24	10.79	0.31	11.13
30	4.42	0.51	0.11	0.03	0.01	0.17	0.06	3.27	0.55	2.34	11.45	0.32	11.80
35	4.78	0.53	0.11	0.03	0.01	0.17	0.06	3.43	0.57	2.45	12.15	0.34	12.52
40	5.16	0.57	0.12	0.03	0.01	0.17	0.06	3.61	0.60	2.58	12.90	0.36	13.28
45	5.55	0.60	0.13	0.03	0.01	0.17	0.06	3.80	0.63	2.72	13.70	0.37	14.10
50	5.96	0.64	0.14	0.03	0.01	0.17	0.06	4.02	0.67	2.87	14.56	0.40	14.99

Table VOC LCV 25
Economic Cost of Operation of Light Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.41	0.39	0.06	0.03	0.01	0.19	0.07	2.60	0.43	1.86	8.06	0.26	8.34
5	2.72	0.41	0.07	0.03	0.01	0.19	0.07	2.70	0.45	1.93	8.58	0.27	8.88
10	3.05	0.43	0.08	0.03	0.01	0.19	0.07	2.80	0.47	2.01	9.13	0.28	9.44
15	3.38	0.45	0.09	0.03	0.01	0.19	0.07	2.92	0.49	2.09	9.71	0.29	10.03
20	3.72	0.47	0.09	0.03	0.01	0.19	0.07	3.05	0.51	2.18	10.31	0.30	10.64
25	4.06	0.49	0.10	0.03	0.01	0.19	0.07	3.18	0.53	2.28	10.95	0.31	11.30
30	4.42	0.52	0.11	0.03	0.01	0.19	0.07	3.33	0.56	2.38	11.63	0.33	11.99
35	4.80	0.55	0.12	0.03	0.01	0.19	0.07	3.50	0.58	2.50	12.35	0.34	12.72
40	5.18	0.58	0.12	0.03	0.01	0.19	0.07	3.68	0.61	2.63	13.12	0.36	13.51
45	5.58	0.62	0.13	0.03	0.01	0.19	0.07	3.88	0.65	2.78	13.94	0.38	14.36
50	5.99	0.67	0.14	0.03	0.01	0.19	0.07	4.11	0.69	2.94	14.83	0.41	15.27

Table VOC LCV 26
Economic Cost of Operation of Light Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.40	0.40	0.07	0.03	0.01	0.22	0.08	2.64	0.44	1.89	8.17	0.26	8.46
5	2.71	0.42	0.07	0.03	0.01	0.22	0.08	2.74	0.46	1.96	8.70	0.27	9.01
10	3.04	0.44	0.08	0.03	0.01	0.22	0.08	2.85	0.48	2.04	9.26	0.28	9.58
15	3.37	0.46	0.09	0.03	0.01	0.22	0.08	2.97	0.50	2.12	9.85	0.29	10.18
20	3.72	0.48	0.09	0.03	0.01	0.22	0.08	3.10	0.52	2.22	10.47	0.31	10.81
25	4.07	0.51	0.10	0.03	0.01	0.22	0.08	3.24	0.54	2.32	11.12	0.32	11.48
30	4.43	0.54	0.11	0.03	0.01	0.22	0.08	3.40	0.57	2.43	11.82	0.33	12.19
35	4.81	0.57	0.12	0.03	0.01	0.22	0.08	3.57	0.60	2.55	12.56	0.35	12.94
40	5.20	0.60	0.12	0.03	0.01	0.22	0.08	3.76	0.63	2.69	13.35	0.37	13.75
45	5.60	0.65	0.13	0.03	0.01	0.22	0.08	3.97	0.66	2.84	14.20	0.39	14.63
50	6.02	0.69	0.14	0.03	0.01	0.22	0.08	4.21	0.70	3.01	15.12	0.41	15.57

Table VOC LCV 27
Economic Cost of Operation of Light Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.39	0.41	0.07	0.03	0.01	0.26	0.09	2.68	0.45	1.91	8.29	0.26	8.60
5	2.70	0.43	0.07	0.03	0.01	0.26	0.09	2.78	0.46	1.99	8.83	0.27	9.15
10	3.03	0.45	0.08	0.03	0.01	0.26	0.09	2.90	0.48	2.07	9.41	0.29	9.73
15	3.37	0.47	0.09	0.03	0.01	0.26	0.09	3.02	0.50	2.16	10.01	0.30	10.35
20	3.72	0.50	0.10	0.03	0.01	0.26	0.09	3.15	0.53	2.26	10.64	0.31	10.99
25	4.08	0.52	0.10	0.03	0.01	0.26	0.09	3.30	0.55	2.36	11.31	0.33	11.68
30	4.44	0.55	0.11	0.03	0.01	0.26	0.09	3.46	0.58	2.48	12.02	0.34	12.40
35	4.83	0.59	0.12	0.03	0.01	0.26	0.09	3.64	0.61	2.61	12.78	0.36	13.18
40	5.22	0.63	0.13	0.03	0.01	0.26	0.09	3.84	0.64	2.75	13.59	0.38	14.01
45	5.63	0.67	0.13	0.03	0.01	0.26	0.09	4.06	0.68	2.90	14.47	0.40	14.91
50	6.06	0.72	0.14	0.03	0.02	0.26	0.09	4.31	0.72	3.08	15.43	0.42	15.89

Table VOC LCV 28
Economic Cost of Operation of Light Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.37	0.42	0.07	0.03	0.01	0.29	0.11	2.72	0.45	1.94	8.42	0.27	8.74
5	2.70	0.44	0.08	0.03	0.01	0.29	0.11	2.83	0.47	2.02	8.98	0.28	9.30
10	3.03	0.46	0.08	0.03	0.01	0.29	0.11	2.94	0.49	2.11	9.56	0.29	9.90
15	3.37	0.49	0.09	0.03	0.01	0.29	0.11	3.07	0.51	2.20	10.17	0.30	10.52
20	3.72	0.51	0.10	0.03	0.01	0.29	0.11	3.21	0.54	2.30	10.82	0.32	11.19
25	4.08	0.54	0.10	0.03	0.01	0.29	0.11	3.36	0.56	2.41	11.51	0.33	11.89
30	4.46	0.57	0.11	0.03	0.01	0.29	0.11	3.53	0.59	2.53	12.24	0.35	12.63
35	4.84	0.61	0.12	0.03	0.01	0.29	0.11	3.72	0.62	2.66	13.02	0.37	13.43
40	5.24	0.65	0.13	0.03	0.01	0.29	0.11	3.93	0.66	2.81	13.86	0.39	14.29
45	5.66	0.70	0.13	0.03	0.02	0.29	0.11	4.16	0.69	2.97	14.77	0.41	15.22
50	6.10	0.75	0.14	0.03	0.02	0.29	0.11	4.42	0.74	3.16	15.76	0.44	16.24

Table VOC LCV 29
Economic Cost of Operation of Light Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.36	0.43	0.07	0.03	0.01	0.34	0.13	2.76	0.46	1.97	8.57	0.27	8.90
5	2.69	0.45	0.08	0.03	0.01	0.34	0.13	2.87	0.48	2.05	9.13	0.28	9.47
10	3.03	0.48	0.08	0.03	0.01	0.34	0.13	2.99	0.50	2.14	9.73	0.30	10.08
15	3.37	0.50	0.09	0.03	0.01	0.34	0.13	3.13	0.52	2.24	10.36	0.31	10.72
20	3.73	0.53	0.10	0.03	0.01	0.34	0.13	3.27	0.55	2.34	11.02	0.32	11.40
25	4.09	0.56	0.11	0.03	0.01	0.34	0.13	3.43	0.57	2.45	11.72	0.34	12.12
30	4.47	0.59	0.11	0.03	0.01	0.34	0.13	3.60	0.60	2.58	12.47	0.36	12.88
35	4.86	0.63	0.12	0.03	0.02	0.34	0.13	3.80	0.63	2.72	13.28	0.37	13.71
40	5.27	0.67	0.13	0.03	0.02	0.34	0.13	4.01	0.67	2.87	14.14	0.40	14.59
45	5.70	0.73	0.14	0.03	0.02	0.34	0.13	4.26	0.71	3.04	15.08	0.42	15.56
50	6.14	0.78	0.14	0.03	0.02	0.34	0.13	4.53	0.76	3.24	16.11	0.45	16.61

Table VOC LCV 30
Economic Cost of Operation of Light Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.36	0.44	0.07	0.03	0.01	0.39	0.14	2.80	0.47	2.01	8.73	0.28	9.07
5	2.69	0.47	0.08	0.03	0.01	0.39	0.14	2.92	0.49	2.09	9.31	0.29	9.66
10	3.03	0.49	0.09	0.03	0.01	0.39	0.14	3.05	0.51	2.18	9.91	0.30	10.28
15	3.37	0.51	0.09	0.03	0.01	0.39	0.14	3.18	0.53	2.28	10.55	0.31	10.93
20	3.73	0.54	0.10	0.03	0.01	0.39	0.14	3.33	0.56	2.38	11.23	0.33	11.62
25	4.11	0.58	0.11	0.03	0.02	0.39	0.14	3.50	0.58	2.50	11.96	0.34	12.36
30	4.49	0.61	0.11	0.03	0.02	0.39	0.14	3.68	0.61	2.63	12.73	0.36	13.15
35	4.89	0.65	0.12	0.03	0.02	0.39	0.14	3.88	0.65	2.78	13.55	0.38	14.00
40	5.30	0.70	0.13	0.03	0.02	0.39	0.14	4.11	0.69	2.94	14.45	0.40	14.92
45	5.73	0.76	0.14	0.03	0.02	0.39	0.14	4.36	0.73	3.12	15.42	0.43	15.92
50	6.19	0.82	0.14	0.03	0.02	0.39	0.14	4.65	0.78	3.32	16.49	0.46	17.01

Table VOC LCV 31
Economic Cost of Operation of Light Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.35	0.46	0.07	0.04	0.01	0.45	0.17	2.85	0.48	2.04	8.90	0.28	9.26
5	2.68	0.48	0.08	0.04	0.01	0.45	0.17	2.97	0.50	2.12	9.49	0.29	9.86
10	3.03	0.50	0.09	0.04	0.01	0.45	0.17	3.10	0.52	2.22	10.11	0.31	10.49
15	3.38	0.53	0.09	0.04	0.02	0.45	0.17	3.24	0.54	2.32	10.77	0.32	11.16
20	3.74	0.56	0.10	0.04	0.02	0.45	0.17	3.40	0.57	2.43	11.47	0.33	11.87
25	4.12	0.60	0.11	0.04	0.02	0.45	0.17	3.57	0.60	2.55	12.21	0.35	12.63
30	4.51	0.64	0.12	0.04	0.02	0.45	0.17	3.76	0.63	2.69	13.00	0.37	13.44
35	4.91	0.68	0.12	0.04	0.02	0.45	0.17	3.97	0.66	2.84	13.85	0.39	14.32
40	5.33	0.73	0.13	0.04	0.02	0.45	0.17	4.20	0.70	3.01	14.78	0.41	15.27
45	5.78	0.79	0.14	0.04	0.02	0.45	0.17	4.47	0.75	3.20	15.79	0.44	16.30
50	6.24	0.86	0.15	0.04	0.02	0.45	0.17	4.77	0.80	3.41	16.90	0.47	17.45

Table VOC LCV 32
Economic Cost of Operation of Light Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.34	0.47	0.07	0.04	0.01	0.52	0.19	2.89	0.48	2.07	9.09	0.29	9.46
5	2.68	0.49	0.08	0.04	0.02	0.52	0.19	3.02	0.50	2.16	9.70	0.30	10.08
10	3.03	0.52	0.09	0.04	0.02	0.52	0.19	3.15	0.53	2.26	10.33	0.31	10.72
15	3.39	0.55	0.10	0.04	0.02	0.52	0.19	3.30	0.55	2.36	11.00	0.33	11.41
20	3.75	0.58	0.10	0.04	0.02	0.52	0.19	3.46	0.58	2.48	11.72	0.34	12.14
25	4.14	0.62	0.11	0.04	0.02	0.52	0.19	3.64	0.61	2.60	12.48	0.36	12.92
30	4.53	0.66	0.12	0.04	0.02	0.52	0.19	3.84	0.64	2.75	13.30	0.38	13.76
35	4.94	0.71	0.13	0.04	0.02	0.52	0.19	4.06	0.68	2.90	14.18	0.40	14.66
40	5.37	0.76	0.13	0.04	0.02	0.52	0.19	4.31	0.72	3.08	15.14	0.42	15.64
45	5.82	0.83	0.14	0.04	0.02	0.52	0.19	4.59	0.77	3.28	16.19	0.45	16.72
50	6.30	0.91	0.15	0.04	0.02	0.52	0.19	4.91	0.82	3.51	17.35	0.48	17.92

Table VOC LCV 33
Economic Cost of Operation of Light Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.67	0.25	0.06	0.03	0.00	0.13	0.05	2.38	0.40	1.70	7.66	0.23	7.92
5	2.96	0.25	0.07	0.03	0.01	0.13	0.05	2.47	0.41	1.77	8.13	0.24	8.40
10	3.25	0.26	0.08	0.03	0.01	0.13	0.05	2.57	0.43	1.84	8.62	0.25	8.90
15	3.55	0.27	0.08	0.03	0.01	0.13	0.05	2.67	0.45	1.91	9.14	0.26	9.42
20	3.86	0.27	0.09	0.03	0.01	0.13	0.05	2.79	0.47	1.99	9.68	0.27	9.98
25	4.18	0.28	0.10	0.03	0.01	0.13	0.05	2.91	0.49	2.08	10.26	0.29	10.57
30	4.51	0.29	0.11	0.03	0.01	0.13	0.05	3.05	0.51	2.18	10.87	0.30	11.19
35	4.86	0.30	0.11	0.03	0.01	0.13	0.05	3.20	0.54	2.29	11.51	0.32	11.85
40	5.21	0.31	0.12	0.03	0.01	0.13	0.05	3.37	0.56	2.41	12.20	0.33	12.55
45	5.58	0.32	0.13	0.03	0.01	0.13	0.05	3.56	0.59	2.54	12.94	0.35	13.31
50	5.97	0.33	0.13	0.03	0.01	0.13	0.05	3.76	0.63	2.69	13.74	0.37	14.13

Table VOC LCV 34
Economic Cost of Operation of Light Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.65	0.25	0.06	0.03	0.01	0.15	0.06	2.41	0.40	1.73	7.74	0.24	8.00
5	2.93	0.26	0.07	0.03	0.01	0.15	0.06	2.51	0.42	1.79	8.22	0.25	8.49
10	3.23	0.26	0.08	0.03	0.01	0.15	0.06	2.61	0.44	1.86	8.72	0.26	9.00
15	3.53	0.27	0.08	0.03	0.01	0.15	0.06	2.72	0.45	1.94	9.24	0.27	9.54
20	3.85	0.28	0.09	0.03	0.01	0.15	0.06	2.84	0.47	2.03	9.80	0.28	10.10
25	4.17	0.29	0.10	0.03	0.01	0.15	0.06	2.97	0.50	2.12	10.39	0.29	10.70
30	4.51	0.29	0.11	0.03	0.01	0.15	0.06	3.11	0.52	2.22	11.01	0.31	11.34
35	4.86	0.30	0.11	0.03	0.01	0.15	0.06	3.27	0.55	2.34	11.67	0.32	12.02
40	5.22	0.31	0.12	0.03	0.01	0.15	0.06	3.44	0.57	2.46	12.38	0.34	12.74
45	5.60	0.32	0.13	0.03	0.01	0.15	0.06	3.64	0.61	2.60	13.14	0.36	13.52
50	5.99	0.34	0.14	0.03	0.01	0.15	0.06	3.85	0.64	2.76	13.96	0.38	14.37

Table VOC LCV 35
Economic Cost of Operation of Light Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.62	0.25	0.06	0.03	0.01	0.17	0.06	2.45	0.41	1.75	7.82	0.24	8.09
5	2.91	0.26	0.07	0.03	0.01	0.17	0.06	2.55	0.43	1.82	8.31	0.25	8.59
10	3.21	0.27	0.08	0.03	0.01	0.17	0.06	2.65	0.44	1.90	8.82	0.26	9.11
15	3.52	0.27	0.08	0.03	0.01	0.17	0.06	2.76	0.46	1.98	9.36	0.27	9.66
20	3.84	0.28	0.09	0.03	0.01	0.17	0.06	2.89	0.48	2.06	9.92	0.28	10.24
25	4.17	0.29	0.10	0.03	0.01	0.17	0.06	3.02	0.50	2.16	10.52	0.30	10.85
30	4.51	0.30	0.11	0.03	0.01	0.17	0.06	3.17	0.53	2.27	11.16	0.31	11.50
35	4.87	0.31	0.11	0.03	0.01	0.17	0.06	3.33	0.56	2.38	11.84	0.33	12.20
40	5.23	0.32	0.12	0.03	0.01	0.17	0.06	3.52	0.59	2.51	12.57	0.35	12.95
45	5.62	0.33	0.13	0.03	0.01	0.17	0.06	3.72	0.62	2.66	13.35	0.37	13.75
50	6.02	0.34	0.14	0.03	0.01	0.17	0.06	3.95	0.66	2.82	14.20	0.39	14.62

Table VOC LCV 36
Economic Cost of Operation of Light Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.60	0.26	0.06	0.03	0.01	0.20	0.07	2.49	0.42	1.78	7.91	0.25	8.19
5	2.89	0.26	0.07	0.03	0.01	0.20	0.07	2.59	0.43	1.85	8.41	0.25	8.69
10	3.20	0.27	0.08	0.03	0.01	0.20	0.07	2.69	0.45	1.93	8.93	0.27	9.23
15	3.51	0.28	0.09	0.03	0.01	0.20	0.07	2.81	0.47	2.01	9.48	0.28	9.79
20	3.83	0.29	0.09	0.03	0.01	0.20	0.07	2.94	0.49	2.10	10.06	0.29	10.38
25	4.17	0.30	0.10	0.03	0.01	0.20	0.07	3.08	0.51	2.20	10.67	0.30	11.01
30	4.51	0.30	0.11	0.03	0.01	0.20	0.07	3.23	0.54	2.31	11.33	0.32	11.68
35	4.87	0.31	0.11	0.03	0.01	0.20	0.07	3.40	0.57	2.43	12.03	0.34	12.39
40	5.25	0.33	0.12	0.03	0.01	0.20	0.07	3.59	0.60	2.57	12.78	0.35	13.16
45	5.64	0.34	0.13	0.03	0.01	0.20	0.07	3.81	0.64	2.72	13.58	0.38	13.99
50	6.04	0.35	0.14	0.03	0.02	0.20	0.07	4.04	0.68	2.89	14.46	0.40	14.89

Table VOC LCV 37
Economic Cost of Operation of Light Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.58	0.26	0.06	0.03	0.01	0.23	0.08	2.52	0.42	1.81	8.01	0.25	8.30
5	2.88	0.27	0.07	0.03	0.01	0.23	0.08	2.63	0.44	1.88	8.52	0.26	8.81
10	3.18	0.28	0.08	0.03	0.01	0.23	0.08	2.74	0.46	1.96	9.05	0.27	9.36
15	3.50	0.28	0.09	0.03	0.01	0.23	0.08	2.86	0.48	2.05	9.61	0.28	9.93
20	3.83	0.29	0.09	0.03	0.01	0.23	0.08	2.99	0.50	2.14	10.20	0.30	10.54
25	4.17	0.30	0.10	0.03	0.01	0.23	0.08	3.14	0.52	2.24	10.83	0.31	11.18
30	4.52	0.31	0.11	0.03	0.01	0.23	0.08	3.30	0.55	2.36	11.51	0.33	11.87
35	4.88	0.32	0.12	0.03	0.01	0.23	0.08	3.48	0.58	2.49	12.22	0.34	12.60
40	5.26	0.33	0.12	0.03	0.01	0.23	0.08	3.67	0.61	2.63	12.99	0.36	13.39
45	5.66	0.34	0.13	0.03	0.02	0.23	0.08	3.90	0.65	2.79	13.83	0.38	14.25
50	6.08	0.36	0.14	0.03	0.02	0.23	0.08	4.15	0.69	2.97	14.74	0.41	15.18

Table VOC LCV 38
Economic Cost of Operation of Light Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.56	0.26	0.07	0.03	0.01	0.26	0.10	2.56	0.43	1.83	8.12	0.25	8.42
5	2.86	0.27	0.07	0.03	0.01	0.26	0.10	2.67	0.45	1.91	8.64	0.26	8.94
10	3.17	0.28	0.08	0.03	0.01	0.26	0.10	2.79	0.47	1.99	9.18	0.27	9.50
15	3.49	0.29	0.09	0.03	0.01	0.26	0.10	2.91	0.49	2.08	9.75	0.29	10.08
20	3.82	0.30	0.09	0.03	0.01	0.26	0.10	3.05	0.51	2.18	10.36	0.30	10.70
25	4.17	0.31	0.10	0.03	0.01	0.26	0.10	3.20	0.53	2.29	11.01	0.32	11.37
30	4.52	0.32	0.11	0.03	0.01	0.26	0.10	3.37	0.56	2.41	11.70	0.33	12.07
35	4.90	0.33	0.12	0.03	0.02	0.26	0.10	3.55	0.59	2.54	12.43	0.35	12.83
40	5.28	0.34	0.12	0.03	0.02	0.26	0.10	3.76	0.63	2.69	13.23	0.37	13.64
45	5.69	0.35	0.13	0.03	0.02	0.26	0.10	3.99	0.67	2.86	14.09	0.39	14.53
50	6.11	0.36	0.14	0.03	0.02	0.26	0.10	4.26	0.71	3.04	15.03	0.42	15.50

Table VOC LCV 39
Economic Cost of Operation of Light Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.54	0.27	0.07	0.03	0.01	0.30	0.11	2.61	0.44	1.86	8.24	0.26	8.55
5	2.85	0.28	0.07	0.03	0.01	0.30	0.11	2.72	0.45	1.94	8.77	0.27	9.08
10	3.16	0.28	0.08	0.03	0.01	0.30	0.11	2.83	0.47	2.03	9.32	0.28	9.65
15	3.49	0.29	0.09	0.03	0.01	0.30	0.11	2.96	0.50	2.12	9.91	0.29	10.25
20	3.82	0.30	0.09	0.03	0.01	0.30	0.11	3.11	0.52	2.22	10.53	0.31	10.89
25	4.17	0.31	0.10	0.03	0.02	0.30	0.11	3.26	0.55	2.33	11.20	0.32	11.57
30	4.53	0.32	0.11	0.03	0.02	0.30	0.11	3.44	0.57	2.46	11.90	0.34	12.29
35	4.91	0.33	0.12	0.03	0.02	0.30	0.11	3.63	0.61	2.60	12.66	0.36	13.07
40	5.30	0.34	0.12	0.03	0.02	0.30	0.11	3.85	0.64	2.75	13.48	0.38	13.91
45	5.72	0.36	0.13	0.03	0.02	0.30	0.11	4.09	0.68	2.93	14.38	0.40	14.83
50	6.15	0.37	0.14	0.03	0.02	0.30	0.11	4.37	0.73	3.13	15.35	0.43	15.83

Table VOC LCV 40
Economic Cost of Operation of Light Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.52	0.27	0.07	0.04	0.01	0.35	0.13	2.65	0.44	1.89	8.37	0.26	8.69
5	2.83	0.28	0.07	0.04	0.01	0.35	0.13	2.76	0.46	1.97	8.91	0.27	9.24
10	3.15	0.29	0.08	0.04	0.01	0.35	0.13	2.88	0.48	2.06	9.48	0.28	9.82
15	3.48	0.30	0.09	0.04	0.02	0.35	0.13	3.02	0.50	2.16	10.08	0.30	10.43
20	3.82	0.31	0.10	0.04	0.02	0.35	0.13	3.17	0.53	2.27	10.72	0.31	11.09
25	4.18	0.32	0.10	0.04	0.02	0.35	0.13	3.33	0.56	2.38	11.40	0.33	11.78
30	4.54	0.33	0.11	0.04	0.02	0.35	0.13	3.51	0.59	2.51	12.13	0.35	12.53
35	4.93	0.34	0.12	0.04	0.02	0.35	0.13	3.71	0.62	2.66	12.91	0.37	13.33
40	5.33	0.35	0.12	0.04	0.02	0.35	0.13	3.94	0.66	2.82	13.76	0.39	14.20
45	5.75	0.37	0.13	0.04	0.02	0.35	0.13	4.20	0.70	3.00	14.68	0.41	15.15
50	6.19	0.38	0.14	0.04	0.02	0.35	0.13	4.49	0.75	3.21	15.70	0.44	16.20

Table VOC LCV 41
Economic Cost of Operation of Light Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	2.51	0.28	0.07	0.04	0.01	0.40	0.15	2.69	0.45	1.93	8.52	0.27	8.85
5	2.82	0.28	0.07	0.04	0.02	0.40	0.15	2.81	0.47	2.01	9.07	0.28	9.41
10	3.14	0.29	0.08	0.04	0.02	0.40	0.15	2.94	0.49	2.10	9.65	0.29	10.01
15	3.48	0.30	0.09	0.04	0.02	0.40	0.15	3.08	0.51	2.20	10.27	0.30	10.63
20	3.83	0.31	0.10	0.04	0.02	0.40	0.15	3.23	0.54	2.31	10.92	0.32	11.30
25	4.18	0.32	0.10	0.04	0.02	0.40	0.15	3.40	0.57	2.43	11.62	0.34	12.02
30	4.56	0.33	0.11	0.04	0.02	0.40	0.15	3.59	0.60	2.57	12.37	0.35	12.79
35	4.95	0.35	0.12	0.04	0.02	0.40	0.15	3.80	0.63	2.72	13.17	0.37	13.61
40	5.36	0.36	0.13	0.04	0.02	0.40	0.15	4.04	0.67	2.89	14.05	0.40	14.51
45	5.78	0.37	0.13	0.04	0.02	0.40	0.15	4.31	0.72	3.08	15.01	0.42	15.50
50	6.24	0.39	0.14	0.04	0.02	0.40	0.15	4.62	0.77	3.30	16.07	0.46	16.59

Table VOC LCV 42
Financial Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.13	0.86	0.13	0.05	0.01	0.37	0.14	3.29	0.69	2.05	11.72	0.26	11.97
5	4.80	0.91	0.15	0.05	0.01	0.37	0.14	3.41	0.71	2.13	12.67	0.27	12.93
10	5.48	0.96	0.16	0.05	0.01	0.37	0.14	3.53	0.74	2.21	13.66	0.28	13.93
15	6.17	1.03	0.18	0.05	0.01	0.37	0.14	3.67	0.77	2.29	14.68	0.29	14.97
20	6.88	1.10	0.19	0.05	0.02	0.37	0.14	3.82	0.80	2.39	15.76	0.30	16.06
25	7.60	1.18	0.21	0.05	0.02	0.37	0.14	3.99	0.83	2.49	16.88	0.31	17.19
30	8.35	1.27	0.22	0.05	0.02	0.37	0.14	4.17	0.87	2.60	18.06	0.33	18.39
35	9.11	1.39	0.24	0.05	0.02	0.37	0.14	4.36	0.91	2.72	19.31	0.34	19.65
40	9.90	1.52	0.25	0.05	0.02	0.37	0.14	4.58	0.96	2.86	20.64	0.36	21.00
45	10.71	1.68	0.27	0.05	0.02	0.37	0.14	4.81	1.01	3.00	22.06	0.38	22.44
50	11.55	1.88	0.28	0.05	0.02	0.37	0.14	5.07	1.06	3.17	23.60	0.40	24.00

Table VOC LCV 43
Financial Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.13	0.89	0.14	0.06	0.01	0.43	0.16	3.33	0.70	2.08	11.92	0.26	12.18
5	4.80	0.94	0.15	0.06	0.01	0.43	0.16	3.46	0.72	2.16	12.88	0.27	13.15
10	5.49	1.00	0.17	0.06	0.01	0.43	0.16	3.59	0.75	2.24	13.89	0.28	14.17
15	6.19	1.07	0.18	0.06	0.02	0.43	0.16	3.73	0.78	2.33	14.93	0.29	15.22
20	6.90	1.14	0.20	0.06	0.02	0.43	0.16	3.89	0.81	2.43	16.03	0.30	16.33
25	7.63	1.23	0.21	0.06	0.02	0.43	0.16	4.06	0.85	2.53	17.18	0.32	17.49
30	8.39	1.33	0.23	0.06	0.02	0.43	0.16	4.24	0.89	2.65	18.39	0.33	18.72
35	9.16	1.46	0.24	0.06	0.02	0.43	0.16	4.44	0.93	2.77	19.67	0.35	20.01
40	9.96	1.60	0.26	0.06	0.02	0.43	0.16	4.67	0.98	2.91	21.04	0.36	21.40
45	10.78	1.78	0.27	0.06	0.03	0.43	0.16	4.91	1.03	3.07	22.51	0.38	22.89
50	11.63	2.01	0.29	0.06	0.03	0.43	0.16	5.19	1.08	3.24	24.10	0.40	24.51

Table VOC LCV 44
Financial Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.13	0.92	0.14	0.06	0.01	0.49	0.18	3.38	0.71	2.11	12.13	0.26	12.40
5	4.81	0.97	0.16	0.06	0.02	0.49	0.18	3.51	0.73	2.19	13.11	0.27	13.39
10	5.50	1.03	0.17	0.06	0.02	0.49	0.18	3.64	0.76	2.27	14.14	0.28	14.42
15	6.20	1.11	0.19	0.06	0.02	0.49	0.18	3.79	0.79	2.37	15.20	0.30	15.50
20	6.93	1.19	0.20	0.06	0.02	0.49	0.18	3.95	0.83	2.47	16.32	0.31	16.63
25	7.67	1.29	0.22	0.06	0.02	0.49	0.18	4.13	0.86	2.58	17.49	0.32	17.81
30	8.43	1.40	0.23	0.06	0.02	0.49	0.18	4.32	0.90	2.70	18.73	0.34	19.07
35	9.21	1.53	0.25	0.06	0.03	0.49	0.18	4.53	0.95	2.83	20.05	0.35	20.40
40	10.01	1.70	0.26	0.06	0.03	0.49	0.18	4.76	1.00	2.97	21.46	0.37	21.83
45	10.85	1.90	0.28	0.06	0.03	0.49	0.18	5.02	1.05	3.13	22.99	0.39	23.38
50	11.72	2.16	0.29	0.06	0.03	0.49	0.18	5.30	1.11	3.31	24.65	0.41	25.07

Table VOC LCV 45
Financial Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.14	0.95	0.15	0.06	0.02	0.57	0.21	3.43	0.72	2.14	12.37	0.27	12.64
5	4.82	1.01	0.16	0.06	0.02	0.57	0.21	3.56	0.74	2.22	13.37	0.28	13.64
10	5.51	1.07	0.18	0.06	0.02	0.57	0.21	3.70	0.77	2.31	14.41	0.29	14.69
15	6.23	1.15	0.19	0.06	0.02	0.57	0.21	3.85	0.81	2.41	15.49	0.30	15.79
20	6.95	1.24	0.21	0.06	0.02	0.57	0.21	4.02	0.84	2.51	16.63	0.31	16.95
25	7.70	1.35	0.22	0.06	0.02	0.57	0.21	4.20	0.88	2.62	17.83	0.33	18.16
30	8.47	1.47	0.24	0.06	0.03	0.57	0.21	4.40	0.92	2.75	19.11	0.34	19.45
35	9.26	1.62	0.25	0.06	0.03	0.57	0.21	4.62	0.97	2.88	20.47	0.36	20.83
40	10.08	1.81	0.27	0.06	0.03	0.57	0.21	4.86	1.02	3.03	21.92	0.38	22.30
45	10.93	2.04	0.28	0.06	0.03	0.57	0.21	5.13	1.07	3.20	23.51	0.40	23.91
50	11.81	2.34	0.30	0.06	0.03	0.57	0.21	5.42	1.13	3.39	25.26	0.42	25.68

Table VOC LCV 46
Financial Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.14	0.98	0.16	0.06	0.02	0.65	0.24	3.48	0.73	2.17	12.63	0.27	12.90
5	4.83	1.04	0.17	0.06	0.02	0.65	0.24	3.61	0.76	2.26	13.64	0.28	13.92
10	5.53	1.11	0.19	0.06	0.02	0.65	0.24	3.76	0.79	2.35	14.70	0.29	14.99
15	6.25	1.20	0.20	0.06	0.02	0.65	0.24	3.92	0.82	2.45	15.81	0.31	16.12
20	6.99	1.30	0.21	0.06	0.03	0.65	0.24	4.09	0.86	2.55	16.98	0.32	17.29
25	7.74	1.41	0.23	0.06	0.03	0.65	0.24	4.28	0.89	2.67	18.21	0.33	18.54
30	8.52	1.55	0.24	0.06	0.03	0.65	0.24	4.48	0.94	2.80	19.52	0.35	19.87
35	9.32	1.72	0.26	0.06	0.03	0.65	0.24	4.71	0.99	2.94	20.92	0.37	21.28
40	10.15	1.93	0.27	0.06	0.03	0.65	0.24	4.96	1.04	3.10	22.43	0.39	22.82
45	11.01	2.19	0.29	0.06	0.03	0.65	0.24	5.24	1.10	3.27	24.09	0.41	24.49
50	11.91	2.54	0.30	0.06	0.03	0.65	0.24	5.55	1.16	3.46	25.93	0.43	26.36

Table VOC LCV 47
Financial Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.15	1.01	0.16	0.07	0.02	0.75	0.28	3.53	0.74	2.20	12.91	0.28	13.18
5	4.84	1.08	0.18	0.07	0.02	0.75	0.28	3.67	0.77	2.29	13.94	0.29	14.23
10	5.55	1.16	0.19	0.07	0.03	0.75	0.28	3.82	0.80	2.38	15.02	0.30	15.32
15	6.28	1.25	0.21	0.07	0.03	0.75	0.28	3.98	0.83	2.49	16.16	0.31	16.47
20	7.02	1.36	0.22	0.07	0.03	0.75	0.28	4.16	0.87	2.60	17.35	0.32	17.67
25	7.78	1.49	0.24	0.07	0.03	0.75	0.28	4.36	0.91	2.72	18.61	0.34	18.95
30	8.57	1.64	0.25	0.07	0.03	0.75	0.28	4.57	0.96	2.85	19.96	0.36	20.32
35	9.38	1.83	0.26	0.07	0.03	0.75	0.28	4.81	1.01	3.00	21.41	0.37	21.78
40	10.22	2.06	0.28	0.07	0.03	0.75	0.28	5.07	1.06	3.16	22.98	0.40	23.38
45	11.10	2.37	0.29	0.07	0.04	0.75	0.28	5.36	1.12	3.34	24.72	0.42	25.14
50	12.02	2.79	0.31	0.07	0.04	0.75	0.28	5.69	1.19	3.55	26.67	0.44	27.12

Table VOC LCV 48
Financial Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.16	1.05	0.17	0.07	0.03	0.86	0.32	3.59	0.75	2.24	13.22	0.28	13.50
5	4.86	1.12	0.18	0.07	0.03	0.86	0.32	3.73	0.78	2.33	14.27	0.29	14.56
10	5.57	1.21	0.20	0.07	0.03	0.86	0.32	3.88	0.81	2.42	15.38	0.30	15.68
15	6.31	1.31	0.21	0.07	0.03	0.86	0.32	4.05	0.85	2.53	16.53	0.32	16.85
20	7.06	1.43	0.23	0.07	0.03	0.86	0.32	4.24	0.89	2.64	17.76	0.33	18.09
25	7.83	1.57	0.24	0.07	0.03	0.86	0.32	4.44	0.93	2.77	19.06	0.35	19.40
30	8.62	1.74	0.26	0.07	0.03	0.86	0.32	4.66	0.97	2.91	20.45	0.36	20.81
35	9.45	1.95	0.27	0.07	0.04	0.86	0.32	4.91	1.03	3.06	21.95	0.38	22.33
40	10.30	2.22	0.29	0.07	0.04	0.86	0.32	5.18	1.08	3.23	23.59	0.40	24.00
45	11.19	2.59	0.30	0.07	0.04	0.86	0.32	5.48	1.15	3.42	25.42	0.43	25.85
50	12.13	3.09	0.31	0.07	0.04	0.86	0.32	5.83	1.22	3.64	27.51	0.45	27.97

Table VOC LCV 49
Financial Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.17	1.09	0.17	0.07	0.03	0.99	0.37	3.64	0.76	2.27	13.56	0.28	13.85
5	4.88	1.17	0.19	0.07	0.03	0.99	0.37	3.79	0.79	2.36	14.64	0.30	14.93
10	5.60	1.26	0.20	0.07	0.03	0.99	0.37	3.95	0.83	2.46	15.76	0.31	16.07
15	6.34	1.37	0.22	0.07	0.03	0.99	0.37	4.12	0.86	2.57	16.95	0.32	17.27
20	7.10	1.50	0.23	0.07	0.03	0.99	0.37	4.32	0.90	2.69	18.20	0.34	18.54
25	7.88	1.66	0.25	0.07	0.04	0.99	0.37	4.52	0.95	2.82	19.54	0.35	19.89
30	8.68	1.85	0.26	0.07	0.04	0.99	0.37	4.76	0.99	2.97	20.98	0.37	21.35
35	9.52	2.09	0.28	0.07	0.04	0.99	0.37	5.01	1.05	3.13	22.54	0.39	22.93
40	10.39	2.41	0.29	0.07	0.04	0.99	0.37	5.30	1.11	3.30	24.27	0.41	24.68
45	11.30	2.84	0.31	0.07	0.04	0.99	0.37	5.62	1.17	3.50	26.21	0.44	26.65
50	12.26	3.46	0.32	0.07	0.04	0.99	0.37	5.98	1.25	3.73	28.47	0.47	28.93

Table VOC LCV 50
Financial Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.19	1.13	0.18	0.07	0.03	1.14	0.42	3.70	0.77	2.31	13.94	0.29	14.23
5	4.90	1.22	0.19	0.07	0.03	1.14	0.42	3.85	0.81	2.40	15.04	0.30	15.34
10	5.63	1.32	0.21	0.07	0.03	1.14	0.42	4.02	0.84	2.51	16.19	0.31	16.50
15	6.37	1.44	0.22	0.07	0.04	1.14	0.42	4.20	0.88	2.62	17.40	0.33	17.73
20	7.14	1.58	0.24	0.07	0.04	1.14	0.42	4.40	0.92	2.74	18.69	0.34	19.04
25	7.93	1.76	0.25	0.07	0.04	1.14	0.42	4.61	0.96	2.88	20.07	0.36	20.43
30	8.75	1.98	0.27	0.07	0.04	1.14	0.42	4.85	1.02	3.03	21.57	0.38	21.95
35	9.60	2.26	0.28	0.07	0.04	1.14	0.42	5.12	1.07	3.20	23.20	0.40	23.60
40	10.48	2.63	0.30	0.07	0.04	1.14	0.42	5.42	1.13	3.38	25.02	0.42	25.44
45	11.41	3.16	0.31	0.07	0.04	1.14	0.42	5.75	1.20	3.59	27.10	0.45	27.55
50	12.39	3.94	0.33	0.07	0.05	1.14	0.42	6.13	1.28	3.83	29.58	0.48	30.06

Table VOC LCV 51
Financial Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 11000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.20	1.18	0.18	0.08	0.03	1.32	0.49	3.76	0.79	2.34	14.36	0.29	14.65
5	4.92	1.27	0.20	0.08	0.03	1.32	0.49	3.91	0.82	2.44	15.48	0.31	15.79
10	5.66	1.38	0.21	0.08	0.04	1.32	0.49	4.09	0.85	2.55	16.66	0.32	16.98
15	6.41	1.52	0.23	0.08	0.04	1.32	0.49	4.27	0.89	2.67	17.90	0.33	18.24
20	7.19	1.67	0.24	0.08	0.04	1.32	0.49	4.48	0.94	2.80	19.23	0.35	19.58
25	7.99	1.87	0.26	0.08	0.04	1.32	0.49	4.71	0.98	2.94	20.66	0.37	21.03
30	8.82	2.12	0.27	0.08	0.04	1.32	0.49	4.96	1.04	3.09	22.22	0.39	22.60
35	9.68	2.45	0.29	0.08	0.04	1.32	0.49	5.23	1.09	3.27	23.93	0.41	24.34
40	10.58	2.90	0.30	0.08	0.05	1.32	0.49	5.55	1.16	3.46	25.87	0.43	26.30
45	11.53	3.55	0.32	0.08	0.05	1.32	0.49	5.90	1.23	3.68	28.12	0.46	28.58
50	12.54	4.57	0.33	0.08	0.05	1.32	0.49	6.29	1.32	3.93	30.90	0.49	31.39

Table VOC LCV 52
Financial Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 12000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.22	1.23	0.19	0.08	0.04	1.52	0.56	3.82	0.80	2.38	14.83	0.30	15.12
5	4.95	1.33	0.20	0.08	0.04	1.52	0.56	3.98	0.83	2.48	15.97	0.31	16.28
10	5.69	1.45	0.22	0.08	0.04	1.52	0.56	4.16	0.87	2.60	17.18	0.32	17.50
15	6.45	1.60	0.23	0.08	0.04	1.52	0.56	4.35	0.91	2.72	18.46	0.34	18.80
20	7.24	1.78	0.25	0.08	0.04	1.52	0.56	4.57	0.96	2.85	19.83	0.36	20.19
25	8.05	2.00	0.26	0.08	0.04	1.52	0.56	4.80	1.00	3.00	21.31	0.37	21.69
30	8.89	2.29	0.28	0.08	0.04	1.52	0.56	5.06	1.06	3.16	22.94	0.39	23.33
35	9.77	2.68	0.29	0.08	0.05	1.52	0.56	5.35	1.12	3.34	24.75	0.42	25.17
40	10.68	3.22	0.31	0.08	0.05	1.52	0.56	5.68	1.19	3.54	26.83	0.44	27.27
45	11.66	4.05	0.32	0.08	0.05	1.52	0.56	6.05	1.26	3.77	29.31	0.47	29.78
50	12.70	5.43	0.34	0.08	0.05	1.52	0.56	6.47	1.35	4.04	32.52	0.50	33.03

Table VOC LCV 53
Financial Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 13000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.24	1.28	0.19	0.08	0.04	1.75	0.64	3.88	0.81	2.42	15.34	0.30	15.65
5	4.98	1.40	0.21	0.08	0.04	1.75	0.64	4.05	0.85	2.53	16.51	0.32	16.83
10	5.73	1.53	0.22	0.08	0.04	1.75	0.64	4.23	0.89	2.64	17.75	0.33	18.08
15	6.50	1.69	0.24	0.08	0.04	1.75	0.64	4.44	0.93	2.77	19.07	0.35	19.42
20	7.29	1.90	0.25	0.08	0.04	1.75	0.64	4.66	0.97	2.91	20.49	0.36	20.86
25	8.12	2.15	0.27	0.08	0.05	1.75	0.64	4.90	1.03	3.06	22.04	0.38	22.42
30	8.97	2.49	0.28	0.08	0.05	1.75	0.64	5.17	1.08	3.23	23.75	0.40	24.15
35	9.86	2.96	0.30	0.08	0.05	1.75	0.64	5.48	1.15	3.42	25.67	0.43	26.10
40	10.80	3.63	0.31	0.08	0.05	1.75	0.64	5.82	1.22	3.63	27.93	0.45	28.39
45	11.80	4.71	0.33	0.08	0.05	1.75	0.64	6.21	1.30	3.87	30.73	0.48	31.22
50	12.87	6.69	0.34	0.08	0.05	1.75	0.64	6.65	1.39	4.15	34.62	0.52	35.14

Table VOC LCV 54
Financial Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 14000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.27	1.34	0.20	0.08	0.04	2.01	0.74	3.95	0.83	2.46	15.92	0.31	16.23
5	5.01	1.47	0.21	0.08	0.04	2.01	0.74	4.12	0.86	2.57	17.12	0.32	17.44
10	5.77	1.62	0.23	0.08	0.04	2.01	0.74	4.31	0.90	2.69	18.39	0.34	18.73
15	6.55	1.80	0.24	0.08	0.05	2.01	0.74	4.52	0.95	2.82	19.76	0.35	20.11
20	7.35	2.03	0.26	0.08	0.05	2.01	0.74	4.75	0.99	2.96	21.23	0.37	21.60
25	8.19	2.33	0.27	0.08	0.05	2.01	0.74	5.01	1.05	3.12	22.85	0.39	23.24
30	9.05	2.73	0.29	0.08	0.05	2.01	0.74	5.29	1.11	3.30	24.65	0.41	25.07
35	9.96	3.29	0.30	0.08	0.05	2.01	0.74	5.61	1.17	3.50	26.73	0.44	27.16
40	10.92	4.16	0.32	0.08	0.05	2.01	0.74	5.97	1.25	3.72	29.22	0.47	29.69
45	11.95	5.63	0.33	0.08	0.05	2.01	0.74	6.38	1.33	3.98	32.49	0.50	32.98
50	13.06	8.73	0.35	0.08	0.06	2.01	0.74	6.84	1.43	4.27	37.57	0.53	38.10

Table VOC LCV 55
Financial Cost of Operation of Light Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 15000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.30	1.41	0.20	0.09	0.04	2.31	0.85	4.01	0.84	2.50	16.56	0.31	16.88
5	5.04	1.55	0.22	0.09	0.05	2.31	0.85	4.19	0.88	2.62	17.80	0.33	18.12
10	5.81	1.71	0.23	0.09	0.05	2.31	0.85	4.39	0.92	2.74	19.11	0.34	19.45
15	6.60	1.92	0.25	0.09	0.05	2.31	0.85	4.61	0.96	2.88	20.52	0.36	20.88
20	7.42	2.18	0.26	0.09	0.05	2.31	0.85	4.85	1.01	3.03	22.06	0.38	22.43
25	8.26	2.53	0.28	0.09	0.05	2.31	0.85	5.11	1.07	3.19	23.76	0.40	24.15
30	9.15	3.01	0.29	0.09	0.05	2.31	0.85	5.41	1.13	3.38	25.68	0.42	26.10
35	10.07	3.72	0.31	0.09	0.05	2.31	0.85	5.74	1.20	3.58	27.94	0.45	28.39
40	11.06	4.86	0.32	0.09	0.06	2.31	0.85	6.12	1.28	3.82	30.77	0.48	31.25
45	12.11	7.00	0.34	0.09	0.06	2.31	0.85	6.55	1.37	4.09	34.78	0.51	35.29
50	13.27	12.54	0.35	0.09	0.06	2.31	0.85	7.05	1.47	4.40	42.39	0.55	42.94

Table VOC LCV 56
Financial Cost of Operation of Light Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.39	0.72	0.13	0.05	0.01	0.28	0.10	3.10	0.65	1.93	11.36	0.24	11.60
5	5.02	0.76	0.15	0.05	0.01	0.28	0.10	3.21	0.67	2.00	12.25	0.25	12.50
10	5.67	0.79	0.16	0.05	0.01	0.28	0.10	3.34	0.70	2.08	13.18	0.26	13.44
15	6.33	0.83	0.18	0.05	0.01	0.28	0.10	3.47	0.73	2.17	14.15	0.27	14.42
20	7.01	0.88	0.19	0.05	0.02	0.28	0.10	3.61	0.76	2.26	15.15	0.28	15.44
25	7.71	0.93	0.21	0.05	0.02	0.28	0.10	3.77	0.79	2.35	16.21	0.29	16.50
30	8.42	0.99	0.22	0.05	0.02	0.28	0.10	3.94	0.82	2.46	17.31	0.31	17.62
35	9.16	1.06	0.24	0.05	0.02	0.28	0.10	4.13	0.86	2.58	18.47	0.32	18.80
40	9.91	1.13	0.25	0.05	0.02	0.28	0.10	4.34	0.91	2.71	19.70	0.34	20.04
45	10.70	1.22	0.26	0.05	0.02	0.28	0.10	4.57	0.96	2.85	21.01	0.36	21.37
50	11.51	1.32	0.28	0.05	0.02	0.28	0.10	4.82	1.01	3.01	22.41	0.38	22.79

Table VOC LCV 57
Financial Cost of Operation of Light Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.38	0.74	0.13	0.06	0.01	0.32	0.12	3.14	0.66	1.96	11.51	0.25	11.76
5	5.01	0.78	0.15	0.06	0.01	0.32	0.12	3.26	0.68	2.03	12.42	0.25	12.67
10	5.67	0.82	0.16	0.06	0.01	0.32	0.12	3.39	0.71	2.11	13.36	0.26	13.63
15	6.34	0.86	0.18	0.06	0.02	0.32	0.12	3.53	0.74	2.20	14.34	0.28	14.62
20	7.02	0.91	0.19	0.06	0.02	0.32	0.12	3.68	0.77	2.29	15.37	0.29	15.66
25	7.72	0.96	0.21	0.06	0.02	0.32	0.12	3.84	0.80	2.40	16.44	0.30	16.74
30	8.45	1.03	0.22	0.06	0.02	0.32	0.12	4.02	0.84	2.51	17.57	0.31	17.88
35	9.19	1.10	0.24	0.06	0.02	0.32	0.12	4.21	0.88	2.63	18.76	0.33	19.09
40	9.96	1.18	0.25	0.06	0.02	0.32	0.12	4.43	0.93	2.76	20.02	0.35	20.37
45	10.75	1.27	0.27	0.06	0.03	0.32	0.12	4.67	0.98	2.91	21.37	0.36	21.73
50	11.58	1.39	0.28	0.06	0.03	0.32	0.12	4.93	1.03	3.08	22.81	0.38	23.19

Table VOC LCV 58
Financial Cost of Operation of Light Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.37	0.76	0.14	0.06	0.01	0.36	0.13	3.19	0.67	1.99	11.68	0.25	11.93
5	5.01	0.80	0.15	0.06	0.02	0.36	0.13	3.31	0.69	2.07	12.60	0.26	12.86
10	5.67	0.84	0.17	0.06	0.02	0.36	0.13	3.44	0.72	2.15	13.56	0.27	13.83
15	6.34	0.89	0.18	0.06	0.02	0.36	0.13	3.58	0.75	2.24	14.56	0.28	14.84
20	7.03	0.94	0.20	0.06	0.02	0.36	0.13	3.74	0.78	2.33	15.60	0.29	15.89
25	7.75	1.00	0.21	0.06	0.02	0.36	0.13	3.91	0.82	2.44	16.70	0.30	17.00
30	8.48	1.06	0.23	0.06	0.02	0.36	0.13	4.09	0.86	2.55	17.85	0.32	18.17
35	9.23	1.14	0.24	0.06	0.03	0.36	0.13	4.30	0.90	2.68	19.07	0.34	19.40
40	10.01	1.23	0.26	0.06	0.03	0.36	0.13	4.52	0.95	2.82	20.36	0.35	20.72
45	10.81	1.33	0.27	0.06	0.03	0.36	0.13	4.77	1.00	2.98	21.75	0.37	22.12
50	11.65	1.46	0.29	0.06	0.03	0.36	0.13	5.05	1.06	3.15	23.24	0.39	23.63

Table VOC LCV 59
Financial Cost of Operation of Light Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.36	0.78	0.14	0.06	0.02	0.42	0.16	3.24	0.68	2.02	11.86	0.25	12.11
5	5.00	0.82	0.16	0.06	0.02	0.42	0.16	3.36	0.70	2.10	12.80	0.26	13.06
10	5.67	0.86	0.17	0.06	0.02	0.42	0.16	3.50	0.73	2.18	13.77	0.27	14.04
15	6.35	0.91	0.19	0.06	0.02	0.42	0.16	3.64	0.76	2.27	14.79	0.28	15.07
20	7.05	0.97	0.20	0.06	0.02	0.42	0.16	3.80	0.80	2.37	15.85	0.30	16.15
25	7.77	1.03	0.22	0.06	0.02	0.42	0.16	3.98	0.83	2.48	16.97	0.31	17.28
30	8.51	1.11	0.23	0.06	0.03	0.42	0.16	4.17	0.87	2.60	18.15	0.33	18.48
35	9.27	1.19	0.25	0.06	0.03	0.42	0.16	4.38	0.92	2.73	19.40	0.34	19.74
40	10.06	1.29	0.26	0.06	0.03	0.42	0.16	4.61	0.97	2.88	20.73	0.36	21.09
45	10.88	1.40	0.28	0.06	0.03	0.42	0.16	4.87	1.02	3.04	22.16	0.38	22.54
50	11.74	1.53	0.29	0.06	0.03	0.42	0.16	5.17	1.08	3.22	23.70	0.40	24.10

Table VOC LCV 60
Financial Cost of Operation of Light Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.35	0.80	0.15	0.06	0.02	0.48	0.18	3.28	0.69	2.05	12.06	0.26	12.32
5	5.00	0.84	0.16	0.06	0.02	0.48	0.18	3.41	0.71	2.13	13.01	0.27	13.28
10	5.67	0.89	0.17	0.06	0.02	0.48	0.18	3.55	0.74	2.22	14.00	0.28	14.28
15	6.36	0.94	0.19	0.06	0.02	0.48	0.18	3.71	0.78	2.31	15.04	0.29	15.33
20	7.07	1.00	0.20	0.06	0.03	0.48	0.18	3.87	0.81	2.42	16.13	0.30	16.43
25	7.80	1.07	0.22	0.06	0.03	0.48	0.18	4.05	0.85	2.53	17.27	0.32	17.59
30	8.54	1.15	0.23	0.06	0.03	0.48	0.18	4.25	0.89	2.65	18.48	0.33	18.81
35	9.32	1.24	0.25	0.06	0.03	0.48	0.18	4.47	0.94	2.79	19.76	0.35	20.11
40	10.12	1.35	0.26	0.06	0.03	0.48	0.18	4.71	0.99	2.94	21.13	0.37	21.50
45	10.95	1.47	0.28	0.06	0.03	0.48	0.18	4.99	1.04	3.11	22.60	0.39	22.99
50	11.82	1.62	0.29	0.06	0.03	0.48	0.18	5.29	1.11	3.30	24.20	0.41	24.61

Table VOC LCV 61
Financial Cost of Operation of Light Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.34	0.82	0.15	0.07	0.02	0.56	0.21	3.33	0.70	2.08	12.28	0.26	12.54
5	5.00	0.87	0.16	0.07	0.02	0.56	0.21	3.47	0.73	2.16	13.25	0.27	13.52
10	5.68	0.92	0.18	0.07	0.03	0.56	0.21	3.61	0.76	2.25	14.26	0.28	14.54
15	6.38	0.98	0.19	0.07	0.03	0.56	0.21	3.77	0.79	2.35	15.31	0.29	15.61
20	7.09	1.04	0.21	0.07	0.03	0.56	0.21	3.94	0.82	2.46	16.42	0.31	16.73
25	7.83	1.11	0.22	0.07	0.03	0.56	0.21	4.13	0.86	2.58	17.59	0.32	17.91
30	8.58	1.20	0.24	0.07	0.03	0.56	0.21	4.34	0.91	2.71	18.83	0.34	19.17
35	9.37	1.30	0.25	0.07	0.03	0.56	0.21	4.56	0.95	2.85	20.15	0.36	20.50
40	10.18	1.41	0.27	0.07	0.03	0.56	0.21	4.82	1.01	3.01	21.56	0.38	21.93
45	11.03	1.55	0.28	0.07	0.04	0.56	0.21	5.10	1.07	3.18	23.08	0.40	23.48
50	11.92	1.72	0.30	0.07	0.04	0.56	0.21	5.42	1.13	3.38	24.74	0.42	25.16

Table VOC LCV 62
Financial Cost of Operation of Light Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.34	0.85	0.15	0.07	0.03	0.64	0.24	3.39	0.71	2.11	12.52	0.26	12.78
5	5.01	0.90	0.17	0.07	0.03	0.64	0.24	3.52	0.74	2.20	13.50	0.27	13.78
10	5.69	0.95	0.18	0.07	0.03	0.64	0.24	3.67	0.77	2.29	14.53	0.29	14.82
15	6.40	1.01	0.20	0.07	0.03	0.64	0.24	3.84	0.80	2.39	15.61	0.30	15.91
20	7.12	1.08	0.21	0.07	0.03	0.64	0.24	4.01	0.84	2.50	16.75	0.31	17.06
25	7.86	1.16	0.23	0.07	0.03	0.64	0.24	4.21	0.88	2.63	17.94	0.33	18.27
30	8.63	1.25	0.24	0.07	0.03	0.64	0.24	4.42	0.93	2.76	19.21	0.35	19.56
35	9.42	1.36	0.26	0.07	0.04	0.64	0.24	4.66	0.98	2.91	20.57	0.36	20.93
40	10.25	1.48	0.27	0.07	0.04	0.64	0.24	4.93	1.03	3.07	22.02	0.38	22.41
45	11.11	1.64	0.29	0.07	0.04	0.64	0.24	5.23	1.09	3.26	23.60	0.41	24.01
50	12.02	1.83	0.30	0.07	0.04	0.64	0.24	5.56	1.16	3.47	25.33	0.43	25.76

Table VOC LCV 63
Financial Cost of Operation of Light Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.34	0.87	0.16	0.07	0.03	0.74	0.27	3.44	0.72	2.15	12.78	0.27	13.05
5	5.01	0.93	0.17	0.07	0.03	0.74	0.27	3.58	0.75	2.23	13.79	0.28	14.07
10	5.71	0.98	0.19	0.07	0.03	0.74	0.27	3.74	0.78	2.33	14.84	0.29	15.13
15	6.42	1.05	0.20	0.07	0.03	0.74	0.27	3.90	0.82	2.44	15.94	0.30	16.24
20	7.15	1.12	0.22	0.07	0.03	0.74	0.27	4.09	0.86	2.55	17.10	0.32	17.42
25	7.90	1.21	0.23	0.07	0.04	0.74	0.27	4.29	0.90	2.68	18.32	0.33	18.66
30	8.68	1.31	0.25	0.07	0.04	0.74	0.27	4.52	0.94	2.82	19.63	0.35	19.98
35	9.48	1.42	0.26	0.07	0.04	0.74	0.27	4.76	1.00	2.97	21.02	0.37	21.39
40	10.32	1.57	0.28	0.07	0.04	0.74	0.27	5.04	1.05	3.15	22.53	0.39	22.92
45	11.20	1.74	0.29	0.07	0.04	0.74	0.27	5.35	1.12	3.34	24.17	0.42	24.58
50	12.13	1.95	0.31	0.07	0.04	0.74	0.27	5.71	1.19	3.56	25.97	0.45	26.42

Table VOC LCV 64
Financial Cost of Operation of Light Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.34	0.90	0.16	0.07	0.03	0.85	0.31	3.49	0.73	2.18	13.08	0.27	13.35
5	5.02	0.96	0.17	0.07	0.03	0.85	0.31	3.64	0.76	2.27	14.10	0.28	14.38
10	5.72	1.02	0.19	0.07	0.03	0.85	0.31	3.80	0.80	2.37	15.17	0.30	15.47
15	6.44	1.09	0.20	0.07	0.04	0.85	0.31	3.98	0.83	2.48	16.29	0.31	16.60
20	7.18	1.17	0.22	0.07	0.04	0.85	0.31	4.17	0.87	2.60	17.48	0.33	17.80
25	7.94	1.26	0.23	0.07	0.04	0.85	0.31	4.38	0.92	2.73	18.74	0.34	19.08
30	8.73	1.37	0.25	0.07	0.04	0.85	0.31	4.61	0.96	2.88	20.08	0.36	20.44
35	9.55	1.50	0.26	0.07	0.04	0.85	0.31	4.87	1.02	3.04	21.52	0.38	21.90
40	10.40	1.66	0.28	0.07	0.04	0.85	0.31	5.16	1.08	3.22	23.08	0.40	23.48
45	11.30	1.85	0.29	0.07	0.04	0.85	0.31	5.49	1.15	3.42	24.79	0.43	25.21
50	12.25	2.09	0.31	0.07	0.05	0.85	0.31	5.86	1.23	3.66	26.68	0.46	27.14

Table VOC LCV 65
Financial Cost of Operation of Light Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.68	0.63	0.13	0.05	0.01	0.24	0.09	2.93	0.61	1.83	11.21	0.25	11.46
5	5.28	0.66	0.14	0.05	0.01	0.24	0.09	3.04	0.64	1.90	12.05	0.26	12.32
10	5.89	0.69	0.16	0.05	0.01	0.24	0.09	3.16	0.66	1.97	12.93	0.27	13.20
15	6.52	0.72	0.17	0.05	0.01	0.24	0.09	3.29	0.69	2.05	13.84	0.28	14.13
20	7.17	0.75	0.19	0.05	0.02	0.24	0.09	3.43	0.72	2.14	14.80	0.30	15.09
25	7.83	0.79	0.20	0.05	0.02	0.24	0.09	3.58	0.75	2.24	15.80	0.31	16.11
30	8.52	0.83	0.22	0.05	0.02	0.24	0.09	3.75	0.78	2.34	16.84	0.32	17.17
35	9.23	0.88	0.23	0.05	0.02	0.24	0.09	3.93	0.82	2.45	17.95	0.34	18.29
40	9.96	0.93	0.25	0.05	0.02	0.24	0.09	4.13	0.86	2.58	19.11	0.36	19.47
45	10.71	0.99	0.26	0.05	0.02	0.24	0.09	4.36	0.91	2.72	20.35	0.37	20.73
50	11.50	1.05	0.28	0.05	0.02	0.24	0.09	4.60	0.96	2.87	21.67	0.40	22.07

Table VOC LCV 66
Financial Cost of Operation of Light Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.65	0.65	0.13	0.06	0.01	0.28	0.10	2.98	0.62	1.86	11.33	0.26	11.59
5	5.25	0.68	0.15	0.06	0.01	0.28	0.10	3.09	0.65	1.93	12.19	0.27	12.46
10	5.87	0.71	0.16	0.06	0.01	0.28	0.10	3.21	0.67	2.01	13.08	0.28	13.36
15	6.51	0.74	0.18	0.06	0.02	0.28	0.10	3.35	0.70	2.09	14.01	0.29	14.30
20	7.17	0.77	0.19	0.06	0.02	0.28	0.10	3.49	0.73	2.18	14.98	0.30	15.28
25	7.84	0.81	0.21	0.06	0.02	0.28	0.10	3.65	0.76	2.28	16.00	0.31	16.32
30	8.53	0.86	0.22	0.06	0.02	0.28	0.10	3.82	0.80	2.38	17.07	0.33	17.40
35	9.25	0.91	0.24	0.06	0.02	0.28	0.10	4.01	0.84	2.50	18.20	0.34	18.54
40	9.99	0.96	0.25	0.06	0.02	0.28	0.10	4.22	0.88	2.63	19.39	0.36	19.76
45	10.76	1.02	0.27	0.06	0.03	0.28	0.10	4.45	0.93	2.78	20.66	0.38	21.05
50	11.56	1.09	0.28	0.06	0.03	0.28	0.10	4.71	0.99	2.94	22.03	0.41	22.43

Table VOC LCV 67
Financial Cost of Operation of Light Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.62	0.66	0.13	0.06	0.01	0.32	0.12	3.02	0.63	1.89	11.47	0.26	11.73
5	5.23	0.69	0.15	0.06	0.02	0.32	0.12	3.14	0.66	1.96	12.34	0.27	12.61
10	5.86	0.72	0.16	0.06	0.02	0.32	0.12	3.27	0.68	2.04	13.25	0.28	13.53
15	6.50	0.76	0.18	0.06	0.02	0.32	0.12	3.40	0.71	2.12	14.19	0.29	14.49
20	7.17	0.80	0.19	0.06	0.02	0.32	0.12	3.55	0.74	2.22	15.18	0.31	15.49
25	7.85	0.84	0.21	0.06	0.02	0.32	0.12	3.72	0.78	2.32	16.22	0.32	16.54
30	8.55	0.88	0.22	0.06	0.02	0.32	0.12	3.89	0.81	2.43	17.31	0.33	17.65
35	9.28	0.94	0.24	0.06	0.03	0.32	0.12	4.09	0.86	2.55	18.47	0.35	18.82
40	10.03	0.99	0.25	0.06	0.03	0.32	0.12	4.31	0.90	2.69	19.69	0.37	20.06
45	10.81	1.06	0.27	0.06	0.03	0.32	0.12	4.55	0.95	2.84	21.00	0.39	21.39
50	11.62	1.14	0.28	0.06	0.03	0.32	0.12	4.82	1.01	3.01	22.40	0.41	22.82

Table VOC LCV 68
Financial Cost of Operation of Light Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.60	0.68	0.14	0.06	0.02	0.37	0.14	3.07	0.64	1.91	11.62	0.26	11.88
5	5.22	0.71	0.15	0.06	0.02	0.37	0.14	3.19	0.67	1.99	12.50	0.27	12.78
10	5.85	0.74	0.17	0.06	0.02	0.37	0.14	3.32	0.69	2.07	13.43	0.29	13.71
15	6.50	0.78	0.18	0.06	0.02	0.37	0.14	3.46	0.72	2.16	14.39	0.30	14.69
20	7.17	0.82	0.20	0.06	0.02	0.37	0.14	3.62	0.76	2.26	15.40	0.31	15.71
25	7.86	0.86	0.21	0.06	0.02	0.37	0.14	3.78	0.79	2.36	16.46	0.33	16.79
30	8.57	0.91	0.23	0.06	0.03	0.37	0.14	3.97	0.83	2.48	17.58	0.34	17.92
35	9.31	0.97	0.24	0.06	0.03	0.37	0.14	4.17	0.87	2.61	18.76	0.36	19.12
40	10.07	1.03	0.26	0.06	0.03	0.37	0.14	4.40	0.92	2.75	20.02	0.38	20.40
45	10.86	1.10	0.27	0.06	0.03	0.37	0.14	4.65	0.97	2.90	21.36	0.40	21.76
50	11.69	1.18	0.29	0.06	0.03	0.37	0.14	4.94	1.03	3.08	22.81	0.42	23.23

Table VOC LCV 69
Financial Cost of Operation of Light Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.58	0.69	0.14	0.06	0.02	0.42	0.16	3.11	0.65	1.94	11.78	0.27	12.05
5	5.20	0.73	0.16	0.06	0.02	0.42	0.16	3.24	0.68	2.02	12.68	0.28	12.96
10	5.84	0.76	0.17	0.06	0.02	0.42	0.16	3.37	0.71	2.11	13.62	0.29	13.91
15	6.50	0.80	0.19	0.06	0.02	0.42	0.16	3.52	0.74	2.20	14.61	0.30	14.91
20	7.18	0.84	0.20	0.06	0.03	0.42	0.16	3.68	0.77	2.30	15.64	0.32	15.95
25	7.88	0.89	0.22	0.06	0.03	0.42	0.16	3.86	0.81	2.41	16.72	0.33	17.05
30	8.60	0.94	0.23	0.06	0.03	0.42	0.16	4.05	0.85	2.53	17.86	0.35	18.21
35	9.34	1.00	0.24	0.06	0.03	0.42	0.16	4.26	0.89	2.66	19.07	0.37	19.44
40	10.12	1.07	0.26	0.06	0.03	0.42	0.16	4.50	0.94	2.81	20.36	0.39	20.75
45	10.92	1.15	0.27	0.06	0.03	0.42	0.16	4.76	1.00	2.97	21.75	0.41	22.16
50	11.76	1.24	0.29	0.06	0.03	0.42	0.16	5.06	1.06	3.16	23.24	0.44	23.68

Table VOC LCV 70
Financial Cost of Operation of Light Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.56	0.71	0.14	0.07	0.02	0.49	0.18	3.16	0.66	1.97	11.97	0.27	12.24
5	5.19	0.75	0.16	0.07	0.02	0.49	0.18	3.29	0.69	2.05	12.88	0.28	13.17
10	5.84	0.78	0.17	0.07	0.03	0.49	0.18	3.43	0.72	2.14	13.84	0.30	14.13
15	6.50	0.82	0.19	0.07	0.03	0.49	0.18	3.58	0.75	2.24	14.84	0.31	15.15
20	7.19	0.87	0.20	0.07	0.03	0.49	0.18	3.75	0.78	2.34	15.89	0.32	16.21
25	7.90	0.92	0.22	0.07	0.03	0.49	0.18	3.93	0.82	2.45	17.00	0.34	17.34
30	8.63	0.97	0.23	0.07	0.03	0.49	0.18	4.13	0.86	2.58	18.17	0.36	18.52
35	9.38	1.04	0.25	0.07	0.03	0.49	0.18	4.35	0.91	2.72	19.41	0.37	19.79
40	10.17	1.11	0.26	0.07	0.03	0.49	0.18	4.60	0.96	2.87	20.74	0.40	21.14
45	10.99	1.19	0.28	0.07	0.04	0.49	0.18	4.88	1.02	3.04	22.17	0.42	22.59
50	11.85	1.29	0.29	0.07	0.04	0.49	0.18	5.19	1.09	3.24	23.72	0.45	24.16

Table VOC LCV 71
Financial Cost of Operation of Light Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.54	0.73	0.15	0.07	0.03	0.56	0.21	3.21	0.67	2.01	12.17	0.28	12.45
5	5.18	0.77	0.16	0.07	0.03	0.56	0.21	3.35	0.70	2.09	13.10	0.29	13.39
10	5.84	0.80	0.18	0.07	0.03	0.56	0.21	3.49	0.73	2.18	14.08	0.30	14.38
15	6.51	0.85	0.19	0.07	0.03	0.56	0.21	3.65	0.76	2.28	15.10	0.31	15.41
20	7.20	0.89	0.21	0.07	0.03	0.56	0.21	3.82	0.80	2.38	16.17	0.33	16.50
25	7.92	0.95	0.22	0.07	0.03	0.56	0.21	4.01	0.84	2.50	17.30	0.34	17.65
30	8.66	1.01	0.24	0.07	0.03	0.56	0.21	4.22	0.88	2.63	18.50	0.36	18.86
35	9.43	1.08	0.25	0.07	0.04	0.56	0.21	4.45	0.93	2.78	19.78	0.38	20.16
40	10.22	1.15	0.27	0.07	0.04	0.56	0.21	4.71	0.98	2.94	21.15	0.40	21.55
45	11.06	1.25	0.28	0.07	0.04	0.56	0.21	5.00	1.05	3.12	22.62	0.43	23.05
50	11.94	1.35	0.30	0.07	0.04	0.56	0.21	5.33	1.11	3.32	24.23	0.46	24.69

Table VOC LCV 72
Financial Cost of Operation of Light Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.53	0.75	0.15	0.07	0.03	0.64	0.24	3.26	0.68	2.04	12.40	0.28	12.68
5	5.18	0.79	0.16	0.07	0.03	0.64	0.24	3.40	0.71	2.12	13.34	0.29	13.64
10	5.84	0.83	0.18	0.07	0.03	0.64	0.24	3.55	0.74	2.22	14.34	0.31	14.64
15	6.52	0.87	0.19	0.07	0.03	0.64	0.24	3.71	0.78	2.32	15.38	0.32	15.70
20	7.22	0.92	0.21	0.07	0.03	0.64	0.24	3.89	0.81	2.43	16.48	0.33	16.81
25	7.95	0.98	0.22	0.07	0.04	0.64	0.24	4.09	0.86	2.55	17.63	0.35	17.99
30	8.70	1.04	0.24	0.07	0.04	0.64	0.24	4.31	0.90	2.69	18.86	0.37	19.23
35	9.48	1.12	0.25	0.07	0.04	0.64	0.24	4.55	0.95	2.84	20.18	0.39	20.57
40	10.29	1.20	0.27	0.07	0.04	0.64	0.24	4.82	1.01	3.01	21.59	0.41	22.00
45	11.14	1.30	0.28	0.07	0.04	0.64	0.24	5.12	1.07	3.20	23.11	0.44	23.55
50	12.04	1.42	0.30	0.07	0.04	0.64	0.24	5.47	1.14	3.41	24.78	0.47	25.25

Table VOC LCV 73
Financial Cost of Operation of Light Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.52	0.77	0.15	0.07	0.03	0.74	0.27	3.32	0.69	2.07	12.64	0.29	12.93
5	5.17	0.81	0.17	0.07	0.03	0.74	0.27	3.46	0.72	2.16	13.61	0.30	13.91
10	5.84	0.85	0.18	0.07	0.03	0.74	0.27	3.61	0.76	2.26	14.62	0.31	14.93
15	6.53	0.90	0.20	0.07	0.04	0.74	0.27	3.78	0.79	2.36	15.69	0.33	16.01
20	7.24	0.95	0.21	0.07	0.04	0.74	0.27	3.97	0.83	2.48	16.81	0.34	17.15
25	7.98	1.01	0.23	0.07	0.04	0.74	0.27	4.17	0.87	2.60	18.00	0.36	18.35
30	8.74	1.08	0.24	0.07	0.04	0.74	0.27	4.40	0.92	2.75	19.26	0.38	19.64
35	9.53	1.16	0.26	0.07	0.04	0.74	0.27	4.65	0.97	2.90	20.61	0.40	21.01
40	10.36	1.26	0.27	0.07	0.04	0.74	0.27	4.94	1.03	3.08	22.07	0.42	22.49
45	11.23	1.36	0.29	0.07	0.04	0.74	0.27	5.26	1.10	3.28	23.65	0.45	24.10
50	12.15	1.49	0.30	0.07	0.05	0.74	0.27	5.62	1.18	3.51	25.39	0.48	25.87

Table VOC LCV 74
Financial Cost of Operation of Light Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.16	0.40	0.13	0.05	0.01	0.19	0.07	2.72	0.57	1.70	11.00	0.23	11.23
5	5.70	0.41	0.14	0.05	0.01	0.19	0.07	2.83	0.59	1.77	11.76	0.24	12.01
10	6.26	0.43	0.16	0.05	0.01	0.19	0.07	2.94	0.62	1.84	12.56	0.25	12.81
15	6.84	0.44	0.17	0.05	0.01	0.19	0.07	3.06	0.64	1.91	13.39	0.26	13.65
20	7.44	0.45	0.19	0.05	0.02	0.19	0.07	3.20	0.67	1.99	14.26	0.27	14.54
25	8.06	0.46	0.20	0.05	0.02	0.19	0.07	3.34	0.70	2.08	15.18	0.29	15.46
30	8.70	0.48	0.22	0.05	0.02	0.19	0.07	3.50	0.73	2.18	16.14	0.30	16.44
35	9.37	0.49	0.23	0.05	0.02	0.19	0.07	3.67	0.77	2.29	17.15	0.32	17.47
40	10.06	0.51	0.25	0.05	0.02	0.19	0.07	3.86	0.81	2.41	18.22	0.33	18.55
45	10.77	0.52	0.26	0.05	0.02	0.19	0.07	4.08	0.85	2.54	19.36	0.35	19.71
50	11.52	0.54	0.28	0.05	0.02	0.19	0.07	4.31	0.90	2.69	20.58	0.37	20.95

Table VOC LCV 75
Financial Cost of Operation of Light Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.11	0.41	0.13	0.06	0.01	0.22	0.08	2.77	0.58	1.73	11.08	0.24	11.31
5	5.66	0.42	0.14	0.06	0.01	0.22	0.08	2.87	0.60	1.79	11.85	0.25	12.10
10	6.23	0.43	0.16	0.06	0.01	0.22	0.08	2.99	0.63	1.86	12.66	0.26	12.92
15	6.82	0.44	0.17	0.06	0.02	0.22	0.08	3.11	0.65	1.94	13.51	0.27	13.78
20	7.42	0.46	0.19	0.06	0.02	0.22	0.08	3.25	0.68	2.03	14.40	0.28	14.68
25	8.05	0.47	0.20	0.06	0.02	0.22	0.08	3.40	0.71	2.12	15.33	0.29	15.62
30	8.70	0.48	0.22	0.06	0.02	0.22	0.08	3.56	0.75	2.22	16.31	0.31	16.62
35	9.37	0.50	0.23	0.06	0.02	0.22	0.08	3.75	0.78	2.34	17.34	0.32	17.67
40	10.07	0.52	0.25	0.06	0.02	0.22	0.08	3.94	0.83	2.46	18.44	0.34	18.78
45	10.80	0.53	0.26	0.06	0.03	0.22	0.08	4.17	0.87	2.60	19.61	0.36	19.97
50	11.56	0.55	0.28	0.06	0.03	0.22	0.08	4.42	0.92	2.76	20.86	0.38	21.24

Table VOC LCV 76
Financial Cost of Operation of Light Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.06	0.42	0.13	0.06	0.01	0.25	0.09	2.81	0.59	1.75	11.16	0.24	11.40
5	5.62	0.43	0.14	0.06	0.02	0.25	0.09	2.92	0.61	1.82	11.95	0.25	12.20
10	6.20	0.44	0.16	0.06	0.02	0.25	0.09	3.04	0.64	1.90	12.78	0.26	13.04
15	6.79	0.45	0.17	0.06	0.02	0.25	0.09	3.17	0.66	1.98	13.64	0.27	13.91
20	7.41	0.46	0.19	0.06	0.02	0.25	0.09	3.31	0.69	2.06	14.54	0.28	14.83
25	8.04	0.48	0.20	0.06	0.02	0.25	0.09	3.46	0.72	2.16	15.49	0.30	15.79
30	8.70	0.49	0.22	0.06	0.02	0.25	0.09	3.63	0.76	2.27	16.50	0.31	16.81
35	9.38	0.51	0.23	0.06	0.03	0.25	0.09	3.82	0.80	2.38	17.56	0.33	17.88
40	10.09	0.53	0.25	0.06	0.03	0.25	0.09	4.03	0.84	2.51	18.68	0.35	19.03
45	10.83	0.54	0.26	0.06	0.03	0.25	0.09	4.26	0.89	2.66	19.88	0.37	20.25
50	11.61	0.56	0.28	0.06	0.03	0.25	0.09	4.52	0.95	2.82	21.17	0.39	21.55

Table VOC LCV 77
Financial Cost of Operation of Light Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.02	0.42	0.13	0.06	0.02	0.29	0.11	2.85	0.60	1.78	11.26	0.25	11.51
5	5.58	0.43	0.15	0.06	0.02	0.29	0.11	2.96	0.62	1.85	12.06	0.25	12.32
10	6.17	0.45	0.16	0.06	0.02	0.29	0.11	3.09	0.65	1.93	12.90	0.27	13.17
15	6.77	0.46	0.18	0.06	0.02	0.29	0.11	3.22	0.67	2.01	13.78	0.28	14.06
20	7.39	0.47	0.19	0.06	0.02	0.29	0.11	3.37	0.70	2.10	14.71	0.29	15.00
25	8.04	0.49	0.21	0.06	0.02	0.29	0.11	3.53	0.74	2.20	15.68	0.30	15.98
30	8.71	0.50	0.22	0.06	0.03	0.29	0.11	3.71	0.78	2.31	16.70	0.32	17.02
35	9.40	0.52	0.23	0.06	0.03	0.29	0.11	3.90	0.82	2.43	17.78	0.34	18.12
40	10.12	0.54	0.25	0.06	0.03	0.29	0.11	4.12	0.86	2.57	18.94	0.35	19.29
45	10.87	0.55	0.26	0.06	0.03	0.29	0.11	4.36	0.91	2.72	20.17	0.38	20.54
50	11.66	0.57	0.28	0.06	0.03	0.29	0.11	4.64	0.97	2.89	21.49	0.40	21.89

Table VOC LCV 78
Financial Cost of Operation of Light Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.97	0.43	0.13	0.06	0.02	0.33	0.12	2.89	0.61	1.81	11.37	0.25	11.62
5	5.55	0.44	0.15	0.06	0.02	0.33	0.12	3.01	0.63	1.88	12.19	0.26	12.45
10	6.14	0.45	0.16	0.06	0.02	0.33	0.12	3.14	0.66	1.96	13.05	0.27	13.32
15	6.75	0.47	0.18	0.06	0.02	0.33	0.12	3.28	0.69	2.05	13.94	0.28	14.22
20	7.38	0.48	0.19	0.06	0.03	0.33	0.12	3.43	0.72	2.14	14.88	0.30	15.18
25	8.04	0.49	0.21	0.06	0.03	0.33	0.12	3.60	0.75	2.24	15.87	0.31	16.18
30	8.71	0.51	0.22	0.06	0.03	0.33	0.12	3.78	0.79	2.36	16.92	0.33	17.25
35	9.42	0.53	0.24	0.06	0.03	0.33	0.12	3.98	0.83	2.49	18.03	0.34	18.37
40	10.15	0.55	0.25	0.06	0.03	0.33	0.12	4.21	0.88	2.63	19.21	0.36	19.58
45	10.92	0.57	0.27	0.06	0.03	0.33	0.12	4.47	0.93	2.79	20.48	0.38	20.87
50	11.72	0.59	0.28	0.06	0.03	0.33	0.12	4.75	0.99	2.97	21.85	0.41	22.26

Table VOC LCV 79
Financial Cost of Operation of Light Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.94	0.43	0.13	0.07	0.02	0.38	0.14	2.94	0.61	1.83	11.50	0.25	11.75
5	5.52	0.45	0.15	0.07	0.02	0.38	0.14	3.06	0.64	1.91	12.33	0.26	12.59
10	6.12	0.46	0.16	0.07	0.03	0.38	0.14	3.19	0.67	1.99	13.20	0.27	13.48
15	6.74	0.47	0.18	0.07	0.03	0.38	0.14	3.34	0.70	2.08	14.12	0.29	14.40
20	7.38	0.49	0.19	0.07	0.03	0.38	0.14	3.49	0.73	2.18	15.08	0.30	15.38
25	8.04	0.50	0.21	0.07	0.03	0.38	0.14	3.67	0.77	2.29	16.09	0.32	16.40
30	8.73	0.52	0.22	0.07	0.03	0.38	0.14	3.86	0.81	2.41	17.16	0.33	17.49
35	9.44	0.54	0.24	0.07	0.03	0.38	0.14	4.07	0.85	2.54	18.30	0.35	18.65
40	10.19	0.56	0.25	0.07	0.03	0.38	0.14	4.31	0.90	2.69	19.51	0.37	19.88
45	10.97	0.58	0.27	0.07	0.04	0.38	0.14	4.58	0.96	2.86	20.82	0.39	21.21
50	11.79	0.60	0.28	0.07	0.04	0.38	0.14	4.88	1.02	3.04	22.23	0.42	22.65

Table VOC LCV 80
Financial Cost of Operation of Light Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.90	0.44	0.13	0.07	0.03	0.44	0.16	2.99	0.62	1.86	11.64	0.26	11.90
5	5.49	0.45	0.15	0.07	0.03	0.44	0.16	3.11	0.65	1.94	12.49	0.27	12.76
10	6.10	0.47	0.16	0.07	0.03	0.44	0.16	3.25	0.68	2.03	13.38	0.28	13.66
15	6.72	0.48	0.18	0.07	0.03	0.44	0.16	3.40	0.71	2.12	14.31	0.29	14.60
20	7.37	0.50	0.19	0.07	0.03	0.44	0.16	3.56	0.74	2.22	15.29	0.31	15.60
25	8.05	0.51	0.21	0.07	0.03	0.44	0.16	3.74	0.78	2.33	16.32	0.32	16.65
30	8.74	0.53	0.22	0.07	0.03	0.44	0.16	3.94	0.82	2.46	17.42	0.34	17.76
35	9.47	0.55	0.24	0.07	0.04	0.44	0.16	4.16	0.87	2.60	18.59	0.36	18.95
40	10.23	0.57	0.25	0.07	0.04	0.44	0.16	4.41	0.92	2.75	19.84	0.38	20.22
45	11.02	0.59	0.27	0.07	0.04	0.44	0.16	4.69	0.98	2.93	21.18	0.40	21.59
50	11.86	0.61	0.28	0.07	0.04	0.44	0.16	5.01	1.05	3.13	22.64	0.43	23.07

Table VOC LCV 81
Financial Cost of Operation of Light Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.87	0.45	0.14	0.07	0.03	0.50	0.19	3.03	0.63	1.89	11.80	0.26	12.06
5	5.46	0.46	0.15	0.07	0.03	0.50	0.19	3.16	0.66	1.97	12.67	0.27	12.94
10	6.08	0.47	0.17	0.07	0.03	0.50	0.19	3.31	0.69	2.06	13.57	0.28	13.85
15	6.72	0.49	0.18	0.07	0.03	0.50	0.19	3.46	0.72	2.16	14.52	0.30	14.82
20	7.37	0.50	0.20	0.07	0.03	0.50	0.19	3.63	0.76	2.27	15.52	0.31	15.83
25	8.06	0.52	0.21	0.07	0.04	0.50	0.19	3.82	0.80	2.38	16.58	0.33	16.91
30	8.76	0.54	0.23	0.07	0.04	0.50	0.19	4.03	0.84	2.51	17.71	0.35	18.05
35	9.50	0.56	0.24	0.07	0.04	0.50	0.19	4.26	0.89	2.66	18.90	0.37	19.27
40	10.28	0.58	0.26	0.07	0.04	0.50	0.19	4.52	0.94	2.82	20.19	0.39	20.58
45	11.09	0.60	0.27	0.07	0.04	0.50	0.19	4.81	1.01	3.00	21.58	0.41	21.99
50	11.94	0.62	0.29	0.07	0.04	0.50	0.19	5.15	1.08	3.21	23.09	0.44	23.53

Table VOC LCV 82
Financial Cost of Operation of Light Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	4.84	0.46	0.14	0.07	0.03	0.58	0.21	3.08	0.65	1.93	11.98	0.27	12.25
5	5.44	0.47	0.15	0.07	0.03	0.58	0.21	3.22	0.67	2.01	12.86	0.28	13.14
10	6.07	0.48	0.17	0.07	0.03	0.58	0.21	3.37	0.70	2.10	13.78	0.29	14.07
15	6.71	0.50	0.18	0.07	0.04	0.58	0.21	3.53	0.74	2.20	14.75	0.30	15.06
20	7.38	0.51	0.20	0.07	0.04	0.58	0.21	3.70	0.77	2.31	15.78	0.32	16.10
25	8.07	0.53	0.21	0.07	0.04	0.58	0.21	3.90	0.82	2.43	16.86	0.34	17.20
30	8.79	0.55	0.23	0.07	0.04	0.58	0.21	4.11	0.86	2.57	18.01	0.35	18.37
35	9.54	0.57	0.24	0.07	0.04	0.58	0.21	4.36	0.91	2.72	19.25	0.37	19.62
40	10.33	0.59	0.26	0.07	0.04	0.58	0.21	4.63	0.97	2.89	20.57	0.40	20.97
45	11.16	0.61	0.27	0.07	0.04	0.58	0.21	4.94	1.03	3.08	22.01	0.42	22.43
50	12.04	0.64	0.29	0.07	0.05	0.58	0.21	5.29	1.11	3.30	23.57	0.46	24.03

VOC Tables for Two-Axle Heavy Commercial Vehicles

(Clause 6.9)

Table VOC HCV 1
Economic Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.19	0.96	0.11	0.07	0.01	0.79	0.29	2.12	0.35	1.97	9.86	0.42	10.42
5	3.33	1.02	0.12	0.07	0.01	0.79	0.29	2.19	0.37	2.05	10.24	0.43	10.81
10	3.49	1.08	0.13	0.07	0.01	0.79	0.29	2.27	0.38	2.12	10.64	0.45	11.23
15	3.66	1.15	0.14	0.07	0.02	0.79	0.29	2.36	0.40	2.20	11.07	0.47	11.68
20	3.84	1.23	0.15	0.07	0.02	0.79	0.29	2.46	0.41	2.29	11.55	0.49	12.17
25	4.03	1.32	0.17	0.07	0.02	0.79	0.29	2.56	0.43	2.39	12.06	0.51	12.71
30	4.24	1.43	0.18	0.07	0.02	0.79	0.29	2.67	0.45	2.49	12.63	0.53	13.29
35	4.47	1.55	0.19	0.07	0.02	0.79	0.29	2.79	0.47	2.61	13.25	0.55	13.94
40	4.73	1.70	0.20	0.07	0.02	0.79	0.29	2.92	0.49	2.73	13.94	0.58	14.66
45	5.00	1.88	0.21	0.07	0.03	0.79	0.29	3.07	0.51	2.87	14.72	0.61	15.47
50	5.31	2.10	0.23	0.07	0.03	0.79	0.29	3.23	0.54	3.02	15.61	0.64	16.39

Table VOC HCV 2
Economic Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.21	0.99	0.11	0.07	0.01	0.91	0.34	2.15	0.36	2.00	10.15	0.42	10.74
5	3.36	1.05	0.12	0.07	0.02	0.91	0.34	2.22	0.37	2.08	10.54	0.44	11.14
10	3.52	1.12	0.14	0.07	0.02	0.91	0.34	2.31	0.39	2.15	10.95	0.46	11.57
15	3.69	1.19	0.15	0.07	0.02	0.91	0.34	2.40	0.40	2.24	11.40	0.47	12.04
20	3.88	1.28	0.16	0.07	0.02	0.91	0.34	2.50	0.42	2.33	11.89	0.49	12.55
25	4.08	1.38	0.17	0.07	0.02	0.91	0.34	2.60	0.44	2.43	12.43	0.51	13.11
30	4.30	1.49	0.18	0.07	0.02	0.91	0.34	2.72	0.46	2.54	13.02	0.54	13.72
35	4.54	1.63	0.19	0.07	0.03	0.91	0.34	2.84	0.48	2.65	13.67	0.56	14.40
40	4.80	1.79	0.21	0.07	0.03	0.91	0.34	2.98	0.50	2.78	14.41	0.59	15.16
45	5.09	2.00	0.22	0.07	0.03	0.91	0.34	3.13	0.53	2.93	15.23	0.62	16.01
50	5.41	2.25	0.23	0.07	0.03	0.91	0.34	3.30	0.55	3.08	16.18	0.65	17.00

Table VOC HCV 3
Economic Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.24	1.02	0.12	0.07	0.02	1.05	0.39	2.18	0.36	2.03	10.47	0.43	11.09
5	3.39	1.09	0.13	0.07	0.02	1.05	0.39	2.26	0.38	2.11	10.87	0.45	11.50
10	3.55	1.16	0.14	0.07	0.02	1.05	0.39	2.34	0.39	2.19	11.30	0.46	11.95
15	3.73	1.24	0.15	0.07	0.02	1.05	0.39	2.44	0.41	2.27	11.77	0.48	12.44
20	3.92	1.33	0.16	0.07	0.02	1.05	0.39	2.54	0.42	2.37	12.28	0.50	12.96
25	4.13	1.44	0.18	0.07	0.03	1.05	0.39	2.65	0.44	2.47	12.84	0.52	13.55
30	4.36	1.57	0.19	0.07	0.03	1.05	0.39	2.77	0.46	2.58	13.45	0.55	14.19
35	4.60	1.72	0.20	0.07	0.03	1.05	0.39	2.90	0.49	2.70	14.14	0.57	14.90
40	4.88	1.90	0.21	0.07	0.03	1.05	0.39	3.04	0.51	2.84	14.91	0.60	15.70
45	5.18	2.13	0.22	0.07	0.03	1.05	0.39	3.20	0.54	2.99	15.79	0.63	16.61
50	5.52	2.42	0.24	0.07	0.03	1.05	0.39	3.38	0.57	3.15	16.81	0.67	17.66

Table VOC HCV 4
Economic Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.26	1.06	0.12	0.08	0.02	1.21	0.45	2.21	0.37	2.06	10.82	0.44	11.47
5	3.42	1.12	0.13	0.08	0.02	1.21	0.45	2.29	0.38	2.14	11.24	0.45	11.90
10	3.59	1.20	0.14	0.08	0.02	1.21	0.45	2.38	0.40	2.22	11.68	0.47	12.37
15	3.77	1.29	0.16	0.08	0.03	1.21	0.45	2.47	0.41	2.31	12.17	0.49	12.87
20	3.97	1.39	0.17	0.08	0.03	1.21	0.45	2.58	0.43	2.41	12.70	0.51	13.42
25	4.18	1.51	0.18	0.08	0.03	1.21	0.45	2.69	0.45	2.51	13.28	0.53	14.03
30	4.42	1.65	0.19	0.08	0.03	1.21	0.45	2.82	0.47	2.63	13.93	0.56	14.70
35	4.67	1.81	0.20	0.08	0.03	1.21	0.45	2.95	0.49	2.76	14.65	0.58	15.45
40	4.96	2.02	0.22	0.08	0.03	1.21	0.45	3.10	0.52	2.90	15.47	0.61	16.30
45	5.28	2.28	0.23	0.08	0.04	1.21	0.45	3.27	0.55	3.05	16.41	0.65	17.27
50	5.64	2.62	0.24	0.08	0.04	1.21	0.45	3.45	0.58	3.22	17.51	0.68	18.40

Table VOC HCV 5
Economic Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.29	1.09	0.13	0.08	0.02	1.39	0.51	2.24	0.38	2.09	11.21	0.44	11.90
5	3.45	1.17	0.14	0.08	0.03	1.39	0.51	2.32	0.39	2.17	11.64	0.46	12.35
10	3.63	1.25	0.15	0.08	0.03	1.39	0.51	2.42	0.40	2.26	12.10	0.48	12.83
15	3.81	1.34	0.16	0.08	0.03	1.39	0.51	2.52	0.42	2.35	12.61	0.50	13.35
20	4.02	1.45	0.17	0.08	0.03	1.39	0.51	2.62	0.44	2.45	13.16	0.52	13.93
25	4.24	1.58	0.18	0.08	0.03	1.39	0.51	2.74	0.46	2.56	13.77	0.54	14.56
30	4.48	1.73	0.20	0.08	0.03	1.39	0.51	2.87	0.48	2.68	14.45	0.57	15.27
35	4.75	1.92	0.21	0.08	0.04	1.39	0.51	3.01	0.50	2.81	15.22	0.60	16.06
40	5.05	2.16	0.22	0.08	0.04	1.39	0.51	3.17	0.53	2.96	16.09	0.63	16.96
45	5.38	2.45	0.23	0.08	0.04	1.39	0.51	3.34	0.56	3.12	17.10	0.66	18.01
50	5.76	2.85	0.24	0.08	0.04	1.39	0.51	3.53	0.59	3.30	18.29	0.70	19.23

Table VOC HCV 6
Economic Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.32	1.13	0.13	0.08	0.03	1.60	0.59	2.27	0.38	2.12	11.65	0.45	12.38
5	3.48	1.21	0.14	0.08	0.03	1.60	0.59	2.36	0.40	2.20	12.09	0.47	12.84
10	3.66	1.30	0.15	0.08	0.03	1.60	0.59	2.45	0.41	2.29	12.57	0.49	13.34
15	3.86	1.40	0.17	0.08	0.03	1.60	0.59	2.56	0.43	2.39	13.10	0.51	13.89
20	4.07	1.52	0.18	0.08	0.03	1.60	0.59	2.67	0.45	2.49	13.68	0.53	14.49
25	4.30	1.66	0.19	0.08	0.04	1.60	0.59	2.79	0.47	2.60	14.32	0.55	15.15
30	4.55	1.83	0.20	0.08	0.04	1.60	0.59	2.92	0.49	2.73	15.04	0.58	15.90
35	4.83	2.04	0.21	0.08	0.04	1.60	0.59	3.07	0.51	2.87	15.85	0.61	16.74
40	5.14	2.31	0.22	0.08	0.04	1.60	0.59	3.23	0.54	3.02	16.78	0.64	17.70
45	5.49	2.66	0.24	0.08	0.04	1.60	0.59	3.41	0.57	3.19	17.87	0.67	18.83
50	5.89	3.12	0.25	0.08	0.04	1.60	0.59	3.61	0.61	3.37	19.17	0.71	20.17

Table VOC HCV 7
Economic Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.35	1.17	0.13	0.08	0.03	1.84	0.68	2.31	0.39	2.15	12.14	0.46	12.92
5	3.52	1.26	0.15	0.08	0.03	1.84	0.68	2.40	0.40	2.24	12.60	0.47	13.40
10	3.71	1.35	0.16	0.08	0.03	1.84	0.68	2.49	0.42	2.33	13.10	0.49	13.92
15	3.91	1.46	0.17	0.08	0.03	1.84	0.68	2.60	0.44	2.43	13.64	0.51	14.49
20	4.12	1.60	0.18	0.08	0.04	1.84	0.68	2.72	0.46	2.54	14.25	0.54	15.11
25	4.36	1.75	0.19	0.08	0.04	1.84	0.68	2.84	0.48	2.65	14.92	0.56	15.81
30	4.62	1.94	0.21	0.08	0.04	1.84	0.68	2.98	0.50	2.78	15.68	0.59	16.60
35	4.91	2.18	0.22	0.08	0.04	1.84	0.68	3.13	0.52	2.92	16.54	0.62	17.49
40	5.24	2.49	0.23	0.08	0.04	1.84	0.68	3.30	0.55	3.08	17.55	0.65	18.53
45	5.61	2.90	0.24	0.08	0.05	1.84	0.68	3.49	0.58	3.26	18.73	0.69	19.75
50	6.03	3.46	0.25	0.08	0.05	1.84	0.68	3.70	0.62	3.46	20.17	0.73	21.23

Table VOC HCV 8
Economic Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.38	1.22	0.14	0.09	0.03	2.12	0.78	2.34	0.39	2.19	12.68	0.46	13.52
5	3.56	1.31	0.15	0.09	0.03	2.12	0.78	2.43	0.41	2.27	13.16	0.48	14.01
10	3.75	1.41	0.16	0.09	0.04	2.12	0.78	2.54	0.42	2.37	13.68	0.50	14.56
15	3.96	1.53	0.17	0.09	0.04	2.12	0.78	2.65	0.44	2.47	14.25	0.52	15.15
20	4.18	1.68	0.19	0.09	0.04	2.12	0.78	2.76	0.46	2.58	14.89	0.55	15.81
25	4.43	1.85	0.20	0.09	0.04	2.12	0.78	2.90	0.49	2.70	15.60	0.57	16.55
30	4.70	2.07	0.21	0.09	0.04	2.12	0.78	3.04	0.51	2.84	16.40	0.60	17.38
35	5.01	2.34	0.22	0.09	0.05	2.12	0.78	3.20	0.54	2.99	17.32	0.63	18.33
40	5.35	2.70	0.23	0.09	0.05	2.12	0.78	3.37	0.57	3.15	18.41	0.67	19.45
45	5.74	3.18	0.25	0.09	0.05	2.12	0.78	3.57	0.60	3.33	19.71	0.71	20.79
50	6.19	3.88	0.26	0.09	0.05	2.12	0.78	3.79	0.64	3.54	21.33	0.75	22.46

Table VOC HCV 9
Economic Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.42	1.27	0.14	0.09	0.04	2.44	0.90	2.38	0.40	2.22	13.29	0.47	14.19
5	3.60	1.36	0.16	0.09	0.04	2.44	0.90	2.47	0.41	2.31	13.78	0.49	14.71
10	3.80	1.48	0.17	0.09	0.04	2.44	0.90	2.58	0.43	2.41	14.33	0.51	15.27
15	4.01	1.61	0.18	0.09	0.04	2.44	0.90	2.69	0.45	2.51	14.93	0.53	15.89
20	4.24	1.77	0.19	0.09	0.04	2.44	0.90	2.82	0.47	2.63	15.60	0.56	16.59
25	4.50	1.97	0.20	0.09	0.04	2.44	0.90	2.95	0.49	2.75	16.35	0.58	17.37
30	4.78	2.21	0.21	0.09	0.05	2.44	0.90	3.10	0.52	2.89	17.20	0.61	18.25
35	5.10	2.53	0.23	0.09	0.05	2.44	0.90	3.27	0.55	3.05	18.20	0.65	19.28
40	5.46	2.95	0.24	0.09	0.05	2.44	0.90	3.45	0.58	3.22	19.38	0.68	20.49
45	5.87	3.53	0.25	0.09	0.05	2.44	0.90	3.66	0.61	3.41	20.82	0.72	21.98
50	6.35	4.41	0.26	0.09	0.05	2.44	0.90	3.89	0.65	3.63	22.68	0.77	23.88

Table VOC HCV 10
Economic Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 11000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.45	1.32	0.15	0.09	0.04	2.81	1.04	2.42	0.40	2.25	13.97	0.48	14.95
5	3.64	1.42	0.16	0.09	0.04	2.81	1.04	2.51	0.42	2.35	14.49	0.50	15.49
10	3.84	1.55	0.17	0.09	0.04	2.81	1.04	2.62	0.44	2.45	15.06	0.52	16.08
15	4.07	1.70	0.18	0.09	0.04	2.81	1.04	2.74	0.46	2.56	15.69	0.54	16.73
20	4.31	1.87	0.20	0.09	0.05	2.81	1.04	2.87	0.48	2.68	16.39	0.57	17.46
25	4.58	2.09	0.21	0.09	0.05	2.81	1.04	3.01	0.50	2.81	17.19	0.60	18.28
30	4.87	2.38	0.22	0.09	0.05	2.81	1.04	3.16	0.53	2.95	18.11	0.63	19.23
35	5.21	2.74	0.23	0.09	0.05	2.81	1.04	3.34	0.56	3.12	19.18	0.66	20.34
40	5.58	3.24	0.24	0.09	0.05	2.81	1.04	3.53	0.59	3.30	20.48	0.70	21.68
45	6.02	3.97	0.25	0.09	0.05	2.81	1.04	3.75	0.63	3.50	22.11	0.74	23.35
50	6.54	5.11	0.27	0.09	0.06	2.81	1.04	3.99	0.67	3.72	24.29	0.79	25.58

Table VOC HCV 11
Economic Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 12000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.49	1.37	0.15	0.10	0.04	3.24	1.19	2.45	0.41	2.29	14.74	0.49	15.80
5	3.69	1.49	0.16	0.10	0.04	3.24	1.19	2.56	0.43	2.39	15.28	0.51	16.36
10	3.90	1.63	0.18	0.10	0.05	3.24	1.19	2.67	0.45	2.49	15.88	0.53	16.98
15	4.13	1.79	0.19	0.10	0.05	3.24	1.19	2.79	0.47	2.60	16.54	0.55	17.67
20	4.38	1.99	0.20	0.10	0.05	3.24	1.19	2.92	0.49	2.73	17.28	0.58	18.44
25	4.66	2.24	0.21	0.10	0.05	3.24	1.19	3.07	0.51	2.87	18.13	0.61	19.32
30	4.97	2.56	0.22	0.10	0.05	3.24	1.19	3.23	0.54	3.02	19.12	0.64	20.34
35	5.32	3.00	0.24	0.10	0.05	3.24	1.19	3.41	0.57	3.18	20.30	0.67	21.55
40	5.72	3.61	0.25	0.10	0.06	3.24	1.19	3.61	0.61	3.37	21.74	0.71	23.03
45	6.18	4.53	0.26	0.10	0.06	3.24	1.19	3.84	0.64	3.58	23.62	0.76	24.95
50	6.73	6.07	0.27	0.10	0.06	3.24	1.19	4.10	0.69	3.82	26.27	0.81	27.66

Table VOC HCV 12
Economic Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 13000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.53	1.44	0.16	0.10	0.05	3.73	1.38	2.49	0.42	2.33	15.61	0.49	16.77
5	3.73	1.56	0.17	0.10	0.05	3.73	1.38	2.60	0.44	2.43	16.17	0.51	17.35
10	3.95	1.71	0.18	0.10	0.05	3.73	1.38	2.72	0.45	2.53	16.80	0.54	18.00
15	4.19	1.89	0.19	0.10	0.05	3.73	1.38	2.84	0.48	2.65	17.50	0.56	18.72
20	4.45	2.12	0.20	0.10	0.05	3.73	1.38	2.98	0.50	2.78	18.29	0.59	19.54
25	4.74	2.41	0.22	0.10	0.05	3.73	1.38	3.13	0.52	2.92	19.20	0.62	20.48
30	5.07	2.79	0.23	0.10	0.06	3.73	1.38	3.30	0.55	3.08	20.27	0.65	21.59
35	5.43	3.31	0.24	0.10	0.06	3.73	1.38	3.49	0.58	3.26	21.57	0.69	22.92
40	5.86	4.06	0.25	0.10	0.06	3.73	1.38	3.70	0.62	3.45	23.21	0.73	24.60
45	6.35	5.27	0.26	0.10	0.06	3.73	1.38	3.94	0.66	3.68	25.42	0.78	26.86
50	6.95	7.49	0.28	0.10	0.06	3.73	1.38	4.21	0.71	3.93	28.82	0.83	30.31

Table VOC HCV 13
Economic Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 14000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.58	1.50	0.16	0.10	0.05	4.29	1.58	2.54	0.42	2.37	16.59	0.50	17.85
5	3.78	1.64	0.17	0.10	0.05	4.29	1.58	2.64	0.44	2.47	17.18	0.52	18.47
10	4.01	1.81	0.19	0.10	0.05	4.29	1.58	2.76	0.46	2.58	17.84	0.55	19.15
15	4.26	2.01	0.20	0.10	0.05	4.29	1.58	2.89	0.48	2.70	18.58	0.57	19.91
20	4.53	2.27	0.21	0.10	0.06	4.29	1.58	3.04	0.51	2.84	19.42	0.60	20.79
25	4.83	2.60	0.22	0.10	0.06	4.29	1.58	3.20	0.54	2.98	20.41	0.63	21.80
30	5.17	3.05	0.23	0.10	0.06	4.29	1.58	3.37	0.57	3.15	21.58	0.67	23.01
35	5.56	3.68	0.24	0.10	0.06	4.29	1.58	3.57	0.60	3.33	23.03	0.71	24.50
40	6.01	4.65	0.26	0.10	0.06	4.29	1.58	3.79	0.64	3.54	24.92	0.75	26.43
45	6.54	6.30	0.27	0.10	0.06	4.29	1.58	4.04	0.68	3.77	27.64	0.80	29.20
50	7.19	9.76	0.28	0.10	0.07	4.29	1.58	4.33	0.73	4.04	32.36	0.86	33.98

Table VOC HCV 14
Economic Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 15000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.62	1.58	0.17	0.11	0.05	4.94	1.82	2.58	0.43	2.41	17.70	0.51	19.09
5	3.84	1.73	0.18	0.11	0.05	4.94	1.82	2.69	0.45	2.51	18.32	0.53	19.73
10	4.07	1.92	0.19	0.11	0.05	4.94	1.82	2.81	0.47	2.63	19.01	0.56	20.45
15	4.33	2.15	0.20	0.11	0.06	4.94	1.82	2.95	0.49	2.75	19.80	0.58	21.26
20	4.61	2.44	0.21	0.11	0.06	4.94	1.82	3.10	0.52	2.89	20.71	0.61	22.20
25	4.93	2.83	0.23	0.11	0.06	4.94	1.82	3.27	0.55	3.05	21.78	0.65	23.30
30	5.29	3.37	0.24	0.11	0.06	4.94	1.82	3.45	0.58	3.22	23.07	0.68	24.63
35	5.70	4.16	0.25	0.11	0.06	4.94	1.82	3.66	0.61	3.41	24.72	0.72	26.32
40	6.18	5.43	0.26	0.11	0.07	4.94	1.82	3.89	0.65	3.63	26.98	0.77	28.62
45	6.75	7.83	0.27	0.11	0.07	4.94	1.82	4.15	0.70	3.88	30.51	0.82	32.21
50	7.45	14.01	0.28	0.11	0.07	4.94	1.82	4.45	0.75	4.16	38.05	0.88	39.80

Table VOC HCV 15
Economic Cost of Operation of Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.21	0.81	0.10	0.07	0.01	0.59	0.22	1.96	0.33	1.83	9.13	0.39	9.62
5	3.34	0.85	0.12	0.07	0.01	0.59	0.22	2.04	0.34	1.90	9.46	0.40	9.96
10	3.47	0.89	0.13	0.07	0.01	0.59	0.22	2.11	0.35	1.97	9.81	0.42	10.33
15	3.62	0.93	0.14	0.07	0.02	0.59	0.22	2.20	0.37	2.05	10.19	0.43	10.73
20	3.78	0.99	0.15	0.07	0.02	0.59	0.22	2.29	0.38	2.13	10.61	0.45	11.16
25	3.95	1.04	0.16	0.07	0.02	0.59	0.22	2.38	0.40	2.23	11.06	0.47	11.63
30	4.14	1.11	0.18	0.07	0.02	0.59	0.22	2.49	0.42	2.33	11.55	0.49	12.15
35	4.34	1.18	0.19	0.07	0.02	0.59	0.22	2.61	0.44	2.43	12.09	0.52	12.71
40	4.57	1.27	0.20	0.07	0.02	0.59	0.22	2.74	0.46	2.55	12.68	0.54	13.33
45	4.83	1.37	0.21	0.07	0.03	0.59	0.22	2.88	0.48	2.69	13.35	0.57	14.02
50	5.11	1.48	0.22	0.07	0.03	0.59	0.22	3.03	0.51	2.83	14.09	0.60	14.79

Table VOC HCV 16
Economic Cost of Operation of Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.23	0.83	0.11	0.07	0.01	0.68	0.25	1.99	0.33	1.86	9.35	0.39	9.87
5	3.35	0.87	0.12	0.07	0.02	0.68	0.25	2.07	0.35	1.93	9.69	0.41	10.22
10	3.49	0.91	0.13	0.07	0.02	0.68	0.25	2.15	0.36	2.00	10.06	0.42	10.60
15	3.65	0.96	0.14	0.07	0.02	0.68	0.25	2.23	0.37	2.08	10.45	0.44	11.01
20	3.81	1.02	0.15	0.07	0.02	0.68	0.25	2.32	0.39	2.17	10.88	0.46	11.46
25	3.99	1.08	0.17	0.07	0.02	0.68	0.25	2.43	0.41	2.26	11.35	0.48	11.95
30	4.18	1.15	0.18	0.07	0.02	0.68	0.25	2.54	0.42	2.37	11.86	0.50	12.48
35	4.40	1.23	0.19	0.07	0.03	0.68	0.25	2.66	0.45	2.48	12.42	0.53	13.07
40	4.64	1.32	0.20	0.07	0.03	0.68	0.25	2.79	0.47	2.61	13.05	0.55	13.72
45	4.90	1.43	0.21	0.07	0.03	0.68	0.25	2.94	0.49	2.74	13.74	0.58	14.44
50	5.20	1.55	0.23	0.07	0.03	0.68	0.25	3.10	0.52	2.90	14.52	0.61	15.25

Table VOC HCV 17
Economic Cost of Operation of Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Type	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.24	0.85	0.11	0.07	0.02	0.78	0.29	2.02	0.34	1.89	9.60	0.40	10.14
5	3.37	0.89	0.12	0.07	0.02	0.78	0.29	2.10	0.35	1.96	9.95	0.41	10.50
10	3.52	0.94	0.13	0.07	0.02	0.78	0.29	2.18	0.37	2.03	10.33	0.43	10.90
15	3.67	0.99	0.15	0.07	0.02	0.78	0.29	2.27	0.38	2.12	10.74	0.45	11.32
20	3.84	1.05	0.16	0.07	0.02	0.78	0.29	2.36	0.40	2.21	11.18	0.47	11.79
25	4.03	1.12	0.17	0.07	0.03	0.78	0.29	2.47	0.41	2.30	11.67	0.49	12.29
30	4.23	1.19	0.18	0.07	0.03	0.78	0.29	2.58	0.43	2.41	12.20	0.51	12.85
35	4.46	1.28	0.19	0.07	0.03	0.78	0.29	2.71	0.45	2.53	12.79	0.54	13.46
40	4.70	1.38	0.21	0.07	0.03	0.78	0.29	2.85	0.48	2.66	13.44	0.56	14.14
45	4.98	1.49	0.22	0.07	0.03	0.78	0.29	3.00	0.50	2.80	14.17	0.59	14.90
50	5.29	1.63	0.23	0.07	0.03	0.78	0.29	3.17	0.53	2.96	14.99	0.63	15.75

Table VOC HCV 18
Economic Cost of Operation of Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Type	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.26	0.87	0.11	0.08	0.02	0.90	0.33	2.05	0.34	1.91	9.88	0.41	10.44
5	3.40	0.92	0.13	0.08	0.02	0.90	0.33	2.13	0.36	1.99	10.24	0.42	10.82
10	3.54	0.97	0.14	0.08	0.02	0.90	0.33	2.21	0.37	2.07	10.63	0.44	11.22
15	3.71	1.02	0.15	0.08	0.03	0.90	0.33	2.30	0.39	2.15	11.05	0.46	11.66
20	3.88	1.09	0.16	0.08	0.03	0.90	0.33	2.40	0.40	2.24	11.51	0.48	12.15
25	4.07	1.16	0.17	0.08	0.03	0.90	0.33	2.51	0.42	2.35	12.02	0.50	12.67
30	4.28	1.24	0.18	0.08	0.03	0.90	0.33	2.63	0.44	2.46	12.57	0.52	13.25
35	4.52	1.33	0.20	0.08	0.03	0.90	0.33	2.76	0.46	2.58	13.18	0.55	13.89
40	4.78	1.44	0.21	0.08	0.03	0.90	0.33	2.91	0.49	2.71	13.87	0.57	14.60
45	5.07	1.56	0.22	0.08	0.04	0.90	0.33	3.07	0.51	2.86	14.63	0.61	15.40
50	5.39	1.72	0.23	0.08	0.04	0.90	0.33	3.25	0.54	3.03	15.50	0.64	16.30

Table VOC HCV 19
Economic Cost of Operation of Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.28	0.90	0.12	0.08	0.02	1.03	0.38	2.08	0.35	1.94	10.18	0.41	10.77
5	3.42	0.94	0.13	0.08	0.03	1.03	0.38	2.16	0.36	2.02	10.55	0.43	11.16
10	3.57	1.00	0.14	0.08	0.03	1.03	0.38	2.25	0.38	2.10	10.95	0.44	11.58
15	3.74	1.06	0.15	0.08	0.03	1.03	0.38	2.34	0.39	2.19	11.39	0.46	12.04
20	3.92	1.12	0.16	0.08	0.03	1.03	0.38	2.45	0.41	2.28	11.87	0.48	12.54
25	4.12	1.20	0.18	0.08	0.03	1.03	0.38	2.56	0.43	2.39	12.40	0.51	13.09
30	4.34	1.29	0.19	0.08	0.03	1.03	0.38	2.68	0.45	2.50	12.98	0.53	13.69
35	4.58	1.39	0.20	0.08	0.04	1.03	0.38	2.82	0.47	2.63	13.62	0.56	14.36
40	4.85	1.51	0.21	0.08	0.04	1.03	0.38	2.97	0.50	2.77	14.34	0.59	15.11
45	5.16	1.64	0.22	0.08	0.04	1.03	0.38	3.14	0.53	2.93	15.15	0.62	15.95
50	5.50	1.81	0.24	0.08	0.04	1.03	0.38	3.32	0.56	3.10	16.07	0.66	16.91

Table VOC HCV 20
Economic Cost of Operation of Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.30	0.92	0.12	0.08	0.03	1.19	0.44	2.11	0.35	1.97	10.51	0.42	11.14
5	3.44	0.97	0.13	0.08	0.03	1.19	0.44	2.20	0.37	2.05	10.90	0.43	11.54
10	3.60	1.03	0.14	0.08	0.03	1.19	0.44	2.29	0.38	2.13	11.32	0.45	11.98
15	3.78	1.09	0.16	0.08	0.03	1.19	0.44	2.38	0.40	2.22	11.77	0.47	12.46
20	3.96	1.16	0.17	0.08	0.03	1.19	0.44	2.49	0.42	2.32	12.27	0.49	12.97
25	4.17	1.25	0.18	0.08	0.04	1.19	0.44	2.61	0.44	2.43	12.82	0.52	13.55
30	4.40	1.34	0.19	0.08	0.04	1.19	0.44	2.74	0.46	2.55	13.42	0.54	14.18
35	4.65	1.45	0.20	0.08	0.04	1.19	0.44	2.88	0.48	2.69	14.10	0.57	14.88
40	4.93	1.58	0.21	0.08	0.04	1.19	0.44	3.03	0.51	2.83	14.85	0.60	15.60
45	5.25	1.73	0.23	0.08	0.04	1.19	0.44	3.21	0.54	2.99	15.71	0.63	16.55
50	5.62	1.92	0.24	0.08	0.04	1.19	0.44	3.40	0.57	3.18	16.69	0.67	17.57

Table VOC HCV 21
Economic Cost of Operation of Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.32	0.95	0.12	0.08	0.03	1.37	0.51	2.14	0.36	2.00	10.89	0.42	11.55
5	3.47	1.00	0.13	0.08	0.03	1.37	0.51	2.23	0.37	2.08	11.29	0.44	11.97
10	3.64	1.06	0.15	0.08	0.03	1.37	0.51	2.32	0.39	2.17	11.72	0.46	12.42
15	3.81	1.13	0.16	0.08	0.03	1.37	0.51	2.42	0.41	2.26	12.19	0.48	12.92
20	4.01	1.21	0.17	0.08	0.04	1.37	0.51	2.54	0.42	2.37	12.71	0.50	13.46
25	4.22	1.30	0.18	0.08	0.04	1.37	0.51	2.66	0.45	2.48	13.28	0.53	14.05
30	4.46	1.40	0.19	0.08	0.04	1.37	0.51	2.79	0.47	2.60	13.92	0.55	14.71
35	4.73	1.52	0.21	0.08	0.04	1.37	0.51	2.94	0.49	2.74	14.62	0.58	15.45
40	5.02	1.66	0.22	0.08	0.04	1.37	0.51	3.10	0.52	2.89	15.42	0.61	16.27
45	5.36	1.83	0.23	0.08	0.05	1.37	0.51	3.28	0.55	3.07	16.32	0.65	17.22
50	5.75	2.04	0.24	0.08	0.05	1.37	0.51	3.49	0.58	3.26	17.37	0.69	18.30

Table VOC HCV 22
Economic Cost of Operation of Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.35	0.98	0.13	0.09	0.03	1.58	0.58	2.18	0.36	2.03	11.30	0.43	12.01
5	3.50	1.04	0.14	0.09	0.03	1.58	0.58	2.27	0.38	2.12	11.72	0.45	12.45
10	3.67	1.10	0.15	0.09	0.04	1.58	0.58	2.36	0.40	2.21	12.17	0.47	12.91
15	3.86	1.17	0.16	0.09	0.04	1.58	0.58	2.47	0.41	2.30	12.66	0.49	13.43
20	4.06	1.26	0.17	0.09	0.04	1.58	0.58	2.58	0.43	2.41	13.20	0.51	13.99
25	4.28	1.35	0.19	0.09	0.04	1.58	0.58	2.71	0.45	2.53	13.80	0.54	14.61
30	4.53	1.46	0.20	0.09	0.04	1.58	0.58	2.85	0.48	2.66	14.46	0.56	15.30
35	4.81	1.59	0.21	0.09	0.05	1.58	0.58	3.00	0.50	2.80	15.20	0.59	16.08
40	5.12	1.75	0.22	0.09	0.05	1.58	0.58	3.17	0.53	2.96	16.04	0.63	16.95
45	5.47	1.94	0.23	0.09	0.05	1.58	0.58	3.36	0.56	3.14	17.01	0.67	17.95
50	5.89	2.18	0.24	0.09	0.05	1.58	0.58	3.58	0.60	3.34	18.13	0.71	19.12

Table VOC HCV 23
Economic Cost of Operation of Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)
Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.37	1.01	0.13	0.09	0.04	1.81	0.67	2.21	0.37	2.07	11.77	0.44	12.53
5	3.53	1.07	0.14	0.09	0.04	1.81	0.67	2.30	0.39	2.15	12.20	0.46	12.98
10	3.71	1.14	0.15	0.09	0.04	1.81	0.67	2.40	0.40	2.24	12.66	0.48	13.46
15	3.90	1.22	0.16	0.09	0.04	1.81	0.67	2.51	0.42	2.35	13.18	0.50	14.00
20	4.11	1.31	0.18	0.09	0.04	1.81	0.67	2.63	0.44	2.46	13.74	0.52	14.58
25	4.34	1.41	0.19	0.09	0.04	1.81	0.67	2.76	0.46	2.58	14.36	0.55	15.23
30	4.60	1.53	0.20	0.09	0.05	1.81	0.67	2.91	0.49	2.71	15.06	0.57	15.96
35	4.89	1.68	0.21	0.09	0.05	1.81	0.67	3.07	0.51	2.86	15.84	0.61	16.77
40	5.22	1.85	0.22	0.09	0.05	1.81	0.67	3.24	0.54	3.03	16.74	0.64	17.70
45	5.60	2.07	0.24	0.09	0.05	1.81	0.67	3.45	0.58	3.22	17.77	0.68	18.77
50	6.04	2.34	0.25	0.09	0.05	1.81	0.67	3.67	0.62	3.43	18.97	0.73	20.02

Table VOC HCV 24
Economic Cost of Operation of Heavy Commercial Vehicles on Two Lane Roads (Rs/km)
Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.25	0.71	0.10	0.07	0.01	0.51	0.19	1.87	0.31	1.74	8.77	0.44	9.30
5	3.36	0.74	0.11	0.07	0.01	0.51	0.19	1.94	0.32	1.81	9.07	0.46	9.62
10	3.48	0.77	0.13	0.07	0.01	0.51	0.19	2.01	0.34	1.88	9.39	0.48	9.96
15	3.61	0.81	0.14	0.07	0.02	0.51	0.19	2.09	0.35	1.95	9.74	0.50	10.33
20	3.76	0.84	0.15	0.07	0.02	0.51	0.19	2.18	0.37	2.04	10.12	0.52	10.73
25	3.92	0.89	0.16	0.07	0.02	0.51	0.19	2.28	0.38	2.12	10.53	0.54	11.16
30	4.09	0.93	0.17	0.07	0.02	0.51	0.19	2.38	0.40	2.22	10.98	0.56	11.64
35	4.28	0.98	0.19	0.07	0.02	0.51	0.19	2.49	0.42	2.33	11.48	0.59	12.16
40	4.49	1.04	0.20	0.07	0.02	0.51	0.19	2.62	0.44	2.44	12.02	0.62	12.73
45	4.73	1.11	0.21	0.07	0.03	0.51	0.19	2.76	0.46	2.57	12.63	0.65	13.37
50	4.99	1.18	0.22	0.07	0.03	0.51	0.19	2.91	0.49	2.71	13.30	0.69	14.08

Table VOC HCV 25
Economic Cost of Operation of Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.26	0.72	0.11	0.07	0.01	0.59	0.22	1.90	0.32	1.77	8.96	0.45	9.52
5	3.37	0.76	0.12	0.07	0.02	0.59	0.22	1.97	0.33	1.84	9.27	0.47	9.84
10	3.50	0.79	0.13	0.07	0.02	0.59	0.22	2.04	0.34	1.91	9.61	0.48	10.19
15	3.63	0.83	0.14	0.07	0.02	0.59	0.22	2.13	0.36	1.99	9.97	0.50	10.58
20	3.78	0.87	0.15	0.07	0.02	0.59	0.22	2.22	0.37	2.07	10.36	0.52	10.99
25	3.95	0.91	0.16	0.07	0.02	0.59	0.22	2.32	0.39	2.16	10.79	0.55	11.44
30	4.13	0.96	0.18	0.07	0.02	0.59	0.22	2.42	0.41	2.26	11.26	0.57	11.93
35	4.33	1.01	0.19	0.07	0.03	0.59	0.22	2.54	0.43	2.37	11.77	0.60	12.48
40	4.55	1.08	0.20	0.07	0.03	0.59	0.22	2.67	0.45	2.49	12.34	0.63	13.08
45	4.80	1.15	0.21	0.07	0.03	0.59	0.22	2.81	0.47	2.63	12.97	0.67	13.74
50	5.07	1.22	0.22	0.07	0.03	0.59	0.22	2.97	0.50	2.78	13.68	0.70	14.49

Table VOC HCV 26
Economic Cost of Operation of Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.27	0.74	0.11	0.07	0.02	0.68	0.25	1.92	0.32	1.80	9.18	0.46	9.75
5	3.39	0.77	0.12	0.07	0.02	0.68	0.25	2.00	0.33	1.86	9.50	0.47	10.09
10	3.52	0.81	0.13	0.07	0.02	0.68	0.25	2.08	0.35	1.94	9.84	0.49	10.45
15	3.66	0.85	0.14	0.07	0.02	0.68	0.25	2.16	0.36	2.02	10.22	0.51	10.85
20	3.81	0.89	0.16	0.07	0.02	0.68	0.25	2.26	0.38	2.10	10.62	0.53	11.28
25	3.98	0.94	0.17	0.07	0.03	0.68	0.25	2.36	0.39	2.20	11.07	0.56	11.75
30	4.17	0.99	0.18	0.07	0.03	0.68	0.25	2.47	0.41	2.30	11.55	0.58	12.26
35	4.38	1.05	0.19	0.07	0.03	0.68	0.25	2.59	0.43	2.42	12.09	0.61	12.82
40	4.61	1.11	0.20	0.07	0.03	0.68	0.25	2.73	0.46	2.54	12.68	0.64	13.45
45	4.87	1.19	0.21	0.07	0.03	0.68	0.25	2.88	0.48	2.68	13.35	0.68	14.15
50	5.16	1.27	0.23	0.07	0.03	0.68	0.25	3.04	0.51	2.84	14.09	0.72	14.93

Table VOC HCV 27
Economic Cost of Operation of Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.28	0.76	0.11	0.08	0.02	0.78	0.29	1.95	0.33	1.82	9.42	0.46	10.02
5	3.40	0.79	0.12	0.08	0.02	0.78	0.29	2.03	0.34	1.89	9.75	0.48	10.36
10	3.54	0.83	0.13	0.08	0.02	0.78	0.29	2.11	0.35	1.97	10.10	0.50	10.74
15	3.68	0.87	0.15	0.08	0.03	0.78	0.29	2.20	0.37	2.05	10.49	0.52	11.15
20	3.84	0.92	0.16	0.08	0.03	0.78	0.29	2.29	0.38	2.14	10.91	0.54	11.59
25	4.02	0.97	0.17	0.08	0.03	0.78	0.29	2.40	0.40	2.24	11.37	0.57	12.08
30	4.22	1.02	0.18	0.08	0.03	0.78	0.29	2.51	0.42	2.35	11.88	0.60	12.61
35	4.43	1.08	0.19	0.08	0.03	0.78	0.29	2.64	0.44	2.47	12.44	0.63	13.20
40	4.67	1.15	0.21	0.08	0.03	0.78	0.29	2.78	0.47	2.60	13.06	0.66	13.86
45	4.94	1.23	0.22	0.08	0.04	0.78	0.29	2.94	0.49	2.74	13.75	0.70	14.59
50	5.25	1.33	0.23	0.08	0.04	0.78	0.29	3.11	0.52	2.91	14.53	0.74	15.41

Table VOC HCV 28
Economic Cost of Operation of Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.29	0.78	0.11	0.08	0.02	0.90	0.33	1.98	0.33	1.85	9.68	0.47	10.31
5	3.42	0.81	0.12	0.08	0.03	0.90	0.33	2.06	0.34	1.92	10.02	0.49	10.67
10	3.56	0.85	0.14	0.08	0.03	0.90	0.33	2.14	0.36	2.00	10.39	0.51	11.06
15	3.71	0.89	0.15	0.08	0.03	0.90	0.33	2.23	0.37	2.09	10.79	0.53	11.48
20	3.88	0.94	0.16	0.08	0.03	0.90	0.33	2.33	0.39	2.18	11.23	0.55	11.94
25	4.06	1.00	0.17	0.08	0.03	0.90	0.33	2.44	0.41	2.28	11.71	0.58	12.45
30	4.26	1.05	0.18	0.08	0.03	0.90	0.33	2.56	0.43	2.39	12.23	0.61	13.00
35	4.49	1.12	0.20	0.08	0.04	0.90	0.33	2.70	0.45	2.52	12.82	0.64	13.62
40	4.74	1.20	0.21	0.08	0.04	0.90	0.33	2.84	0.48	2.65	13.47	0.67	14.30
45	5.03	1.28	0.22	0.08	0.04	0.90	0.33	3.01	0.50	2.81	14.20	0.71	15.07
50	5.35	1.38	0.23	0.08	0.04	0.90	0.33	3.19	0.53	2.98	15.02	0.75	15.94

Table VOC HCV 29
Economic Cost of Operation of Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.31	0.80	0.11	0.08	0.03	1.04	0.38	2.01	0.34	1.88	9.97	0.48	10.63
5	3.44	0.83	0.13	0.08	0.03	1.04	0.38	2.09	0.35	1.95	10.33	0.49	11.00
10	3.58	0.88	0.14	0.08	0.03	1.04	0.38	2.18	0.36	2.03	10.71	0.52	11.41
15	3.74	0.92	0.15	0.08	0.03	1.04	0.38	2.27	0.38	2.12	11.12	0.54	11.84
20	3.91	0.97	0.16	0.08	0.03	1.04	0.38	2.38	0.40	2.22	11.58	0.56	12.32
25	4.11	1.03	0.17	0.08	0.04	1.04	0.38	2.49	0.42	2.32	12.08	0.59	12.85
30	4.32	1.09	0.19	0.08	0.04	1.04	0.38	2.61	0.44	2.44	12.62	0.62	13.43
35	4.55	1.16	0.20	0.08	0.04	1.04	0.38	2.75	0.46	2.57	13.23	0.65	14.07
40	4.82	1.24	0.21	0.08	0.04	1.04	0.38	2.90	0.49	2.71	13.92	0.69	14.79
45	5.12	1.34	0.22	0.08	0.04	1.04	0.38	3.08	0.52	2.87	14.68	0.73	15.59
50	5.46	1.44	0.23	0.08	0.04	1.04	0.38	3.27	0.55	3.05	15.55	0.77	16.51

Table VOC HCV 30
Economic Cost of Operation of Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.33	0.82	0.12	0.08	0.03	1.19	0.44	2.04	0.34	1.91	10.30	0.48	11.00
5	3.46	0.86	0.13	0.08	0.03	1.19	0.44	2.13	0.36	1.98	10.66	0.50	11.38
10	3.61	0.90	0.14	0.08	0.03	1.19	0.44	2.22	0.37	2.07	11.06	0.52	11.79
15	3.77	0.95	0.15	0.08	0.03	1.19	0.44	2.31	0.39	2.16	11.49	0.55	12.25
20	3.95	1.00	0.16	0.08	0.04	1.19	0.44	2.42	0.41	2.26	11.96	0.57	12.75
25	4.15	1.06	0.18	0.08	0.04	1.19	0.44	2.54	0.43	2.37	12.48	0.60	13.29
30	4.37	1.13	0.19	0.08	0.04	1.19	0.44	2.67	0.45	2.49	13.05	0.63	13.90
35	4.62	1.20	0.20	0.08	0.04	1.19	0.44	2.81	0.47	2.62	13.69	0.67	14.57
40	4.90	1.29	0.21	0.08	0.04	1.19	0.44	2.97	0.50	2.77	14.41	0.70	15.32
45	5.21	1.39	0.22	0.08	0.05	1.19	0.44	3.15	0.53	2.94	15.21	0.75	16.17
50	5.58	1.51	0.24	0.08	0.05	1.19	0.44	3.35	0.56	3.13	16.13	0.79	17.14

Table VOC HCV 31
Economic Cost of Operation of Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Cost	Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.34	0.84	0.12	0.09	0.09	0.03	1.38	0.51	2.07	0.35	1.94	10.66	0.49	11.40
5	3.48	0.88	0.13	0.09	0.09	0.03	1.38	0.51	2.16	0.36	2.02	11.04	0.51	11.79
10	3.64	0.93	0.14	0.09	0.09	0.04	1.38	0.51	2.25	0.38	2.10	11.45	0.53	12.23
15	3.81	0.98	0.16	0.09	0.09	0.04	1.38	0.51	2.35	0.39	2.20	11.90	0.56	12.70
20	4.00	1.03	0.17	0.09	0.09	0.04	1.38	0.51	2.47	0.41	2.30	12.39	0.58	13.21
25	4.20	1.10	0.18	0.09	0.09	0.04	1.38	0.51	2.59	0.43	2.42	12.93	0.61	13.78
30	4.43	1.17	0.19	0.09	0.09	0.04	1.38	0.51	2.72	0.46	2.54	13.53	0.64	14.42
35	4.69	1.25	0.20	0.09	0.09	0.05	1.38	0.51	2.87	0.48	2.68	14.19	0.68	15.12
40	4.98	1.35	0.22	0.09	0.09	0.05	1.38	0.51	3.04	0.51	2.84	14.95	0.72	15.91
45	5.32	1.46	0.23	0.09	0.09	0.05	1.38	0.51	3.23	0.54	3.01	15.80	0.76	16.81
50	5.71	1.59	0.24	0.09	0.09	0.05	1.38	0.51	3.44	0.58	3.21	16.78	0.81	17.83

Table VOC HCV 32
Economic Cost of Operation of Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Cost	Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.36	0.86	0.12	0.09	0.09	0.04	1.58	0.58	2.11	0.35	1.97	11.07	0.50	11.85
5	3.51	0.90	0.13	0.09	0.09	0.04	1.58	0.58	2.20	0.37	2.05	11.46	0.52	12.26
10	3.67	0.95	0.15	0.09	0.09	0.04	1.58	0.58	2.29	0.38	2.14	11.88	0.54	12.71
15	3.85	1.01	0.16	0.09	0.09	0.04	1.58	0.58	2.40	0.40	2.24	12.35	0.57	13.20
20	4.04	1.07	0.17	0.09	0.09	0.04	1.58	0.58	2.51	0.42	2.34	12.86	0.59	13.73
25	4.26	1.14	0.18	0.09	0.09	0.04	1.58	0.58	2.64	0.44	2.46	13.42	0.62	14.33
30	4.50	1.21	0.19	0.09	0.09	0.05	1.58	0.58	2.78	0.47	2.59	14.05	0.66	14.99
35	4.77	1.30	0.21	0.09	0.09	0.05	1.58	0.58	2.94	0.49	2.74	14.75	0.69	15.73
40	5.08	1.41	0.22	0.09	0.09	0.05	1.58	0.58	3.11	0.52	2.90	15.54	0.74	16.56
45	5.43	1.53	0.23	0.09	0.09	0.05	1.58	0.58	3.31	0.55	3.09	16.44	0.78	17.51
50	5.84	1.67	0.24	0.09	0.09	0.05	1.58	0.58	3.53	0.59	3.29	17.48	0.84	18.60

Table VOC HCV 33
Economic Cost of Operation of Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.29	0.45	0.10	0.07	0.01	0.40	0.15	1.81	0.30	1.69	8.27	0.43	8.76
5	3.39	0.46	0.11	0.07	0.01	0.40	0.15	1.88	0.31	1.75	8.53	0.44	9.05
10	3.50	0.48	0.12	0.07	0.01	0.40	0.15	1.95	0.33	1.82	8.82	0.46	9.35
15	3.62	0.49	0.14	0.07	0.02	0.40	0.15	2.03	0.34	1.89	9.14	0.48	9.69
20	3.75	0.50	0.15	0.07	0.02	0.40	0.15	2.11	0.35	1.97	9.48	0.50	10.05
25	3.90	0.52	0.16	0.07	0.02	0.40	0.15	2.21	0.37	2.06	9.85	0.52	10.44
30	4.06	0.53	0.17	0.07	0.02	0.40	0.15	2.31	0.39	2.15	10.25	0.55	10.87
35	4.25	0.55	0.18	0.07	0.02	0.40	0.15	2.42	0.41	2.26	10.70	0.57	11.34
40	4.45	0.57	0.20	0.07	0.02	0.40	0.15	2.54	0.43	2.37	11.19	0.60	11.86
45	4.67	0.59	0.21	0.07	0.03	0.40	0.15	2.68	0.45	2.50	11.73	0.63	12.43
50	4.93	0.61	0.22	0.07	0.03	0.40	0.15	2.83	0.47	2.64	12.33	0.67	13.07

Table VOC HCV 34
Economic Cost of Operation of Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.29	0.46	0.10	0.07	0.01	0.46	0.17	1.83	0.31	1.71	8.42	0.43	8.94
5	3.40	0.47	0.11	0.07	0.02	0.46	0.17	1.90	0.32	1.78	8.70	0.45	9.23
10	3.51	0.48	0.13	0.07	0.02	0.46	0.17	1.98	0.33	1.85	9.00	0.47	9.55
15	3.64	0.50	0.14	0.07	0.02	0.46	0.17	2.06	0.35	1.92	9.32	0.49	9.89
20	3.78	0.51	0.15	0.07	0.02	0.46	0.17	2.15	0.36	2.01	9.67	0.51	10.26
25	3.93	0.53	0.16	0.07	0.02	0.46	0.17	2.25	0.38	2.10	10.06	0.53	10.67
30	4.10	0.54	0.17	0.07	0.02	0.46	0.17	2.35	0.39	2.19	10.48	0.56	11.12
35	4.29	0.56	0.18	0.07	0.03	0.46	0.17	2.47	0.41	2.30	10.94	0.58	11.60
40	4.50	0.58	0.20	0.07	0.03	0.46	0.17	2.59	0.43	2.42	11.45	0.61	12.14
45	4.73	0.60	0.21	0.07	0.03	0.46	0.17	2.73	0.46	2.55	12.01	0.65	12.74
50	5.00	0.62	0.22	0.07	0.03	0.46	0.17	2.89	0.48	2.70	12.65	0.68	13.41

Table VOC HCV 35
Economic Cost of Operation of Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.30	0.47	0.10	0.07	0.02	0.53	0.20	1.86	0.31	1.74	8.59	0.44	9.13
5	3.41	0.48	0.11	0.07	0.02	0.53	0.20	1.93	0.32	1.80	8.88	0.46	9.43
10	3.53	0.49	0.13	0.07	0.02	0.53	0.20	2.01	0.34	1.88	9.19	0.48	9.76
15	3.66	0.50	0.14	0.07	0.02	0.53	0.20	2.09	0.35	1.96	9.52	0.50	10.11
20	3.80	0.52	0.15	0.07	0.02	0.53	0.20	2.19	0.37	2.04	9.89	0.52	10.50
25	3.96	0.54	0.16	0.07	0.03	0.53	0.20	2.29	0.38	2.13	10.28	0.54	10.92
30	4.14	0.55	0.17	0.07	0.03	0.53	0.20	2.39	0.40	2.24	10.72	0.57	11.38
35	4.34	0.57	0.19	0.07	0.03	0.53	0.20	2.51	0.42	2.35	11.20	0.60	11.89
40	4.56	0.59	0.20	0.07	0.03	0.53	0.20	2.65	0.44	2.47	11.73	0.63	12.45
45	4.80	0.61	0.21	0.07	0.03	0.53	0.20	2.79	0.47	2.61	12.32	0.66	13.08
50	5.08	0.63	0.22	0.07	0.03	0.53	0.20	2.96	0.50	2.76	12.98	0.70	13.78

Table VOC HCV 36
Economic Cost of Operation of Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.31	0.47	0.10	0.08	0.02	0.61	0.23	1.89	0.32	1.76	8.78	0.45	9.34
5	3.42	0.48	0.12	0.08	0.02	0.61	0.23	1.96	0.33	1.83	9.08	0.46	9.65
10	3.54	0.50	0.13	0.08	0.02	0.61	0.23	2.04	0.34	1.91	9.40	0.48	9.99
15	3.68	0.51	0.14	0.08	0.03	0.61	0.23	2.13	0.36	1.99	9.74	0.50	10.35
20	3.83	0.53	0.15	0.08	0.03	0.61	0.23	2.22	0.37	2.08	10.12	0.53	10.75
25	4.00	0.54	0.16	0.08	0.03	0.61	0.23	2.33	0.39	2.17	10.53	0.55	11.19
30	4.18	0.56	0.18	0.08	0.03	0.61	0.23	2.44	0.41	2.28	10.99	0.58	11.67
35	4.39	0.58	0.19	0.08	0.03	0.61	0.23	2.57	0.43	2.39	11.49	0.61	12.20
40	4.62	0.60	0.20	0.08	0.03	0.61	0.23	2.70	0.45	2.52	12.04	0.64	12.79
45	4.87	0.62	0.21	0.08	0.04	0.61	0.23	2.86	0.48	2.67	12.66	0.68	13.44
50	5.17	0.64	0.22	0.08	0.04	0.61	0.23	3.03	0.51	2.83	13.35	0.72	14.18

Table VOC HCV 37
Economic Cost of Operation of Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.32	0.48	0.11	0.08	0.02	0.70	0.26	1.92	0.32	1.79	8.99	0.45	9.57
5	3.43	0.49	0.12	0.08	0.03	0.70	0.26	1.99	0.33	1.86	9.30	0.47	9.89
10	3.56	0.51	0.13	0.08	0.03	0.70	0.26	2.08	0.35	1.94	9.63	0.49	10.24
15	3.70	0.52	0.14	0.08	0.03	0.70	0.26	2.17	0.36	2.02	9.98	0.51	10.62
20	3.86	0.54	0.15	0.08	0.03	0.70	0.26	2.26	0.38	2.11	10.38	0.54	11.04
25	4.03	0.55	0.16	0.08	0.03	0.70	0.26	2.37	0.40	2.21	10.80	0.56	11.49
30	4.22	0.57	0.18	0.08	0.03	0.70	0.26	2.49	0.42	2.32	11.27	0.59	11.99
35	4.44	0.59	0.19	0.08	0.04	0.70	0.26	2.62	0.44	2.44	11.79	0.62	12.54
40	4.68	0.61	0.20	0.08	0.04	0.70	0.26	2.76	0.46	2.58	12.37	0.65	13.15
45	4.95	0.63	0.21	0.08	0.04	0.70	0.26	2.92	0.49	2.73	13.02	0.69	13.84
50	5.27	0.66	0.22	0.08	0.04	0.70	0.26	3.10	0.52	2.90	13.75	0.73	14.61

Table VOC HCV 38
Economic Cost of Operation of Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.33	0.49	0.11	0.08	0.03	0.81	0.30	1.95	0.33	1.82	9.23	0.46	9.83
5	3.45	0.50	0.12	0.08	0.03	0.81	0.30	2.03	0.34	1.89	9.54	0.48	10.16
10	3.58	0.51	0.13	0.08	0.03	0.81	0.30	2.11	0.35	1.97	9.88	0.50	10.52
15	3.73	0.53	0.14	0.08	0.03	0.81	0.30	2.20	0.37	2.06	10.25	0.52	10.92
20	3.89	0.55	0.15	0.08	0.03	0.81	0.30	2.31	0.39	2.15	10.66	0.55	11.35
25	4.07	0.56	0.17	0.08	0.04	0.81	0.30	2.42	0.40	2.26	11.10	0.57	11.82
30	4.27	0.58	0.18	0.08	0.04	0.81	0.30	2.54	0.43	2.37	11.59	0.60	12.34
35	4.50	0.60	0.19	0.08	0.04	0.81	0.30	2.67	0.45	2.50	12.13	0.63	12.91
40	4.75	0.62	0.20	0.08	0.04	0.81	0.30	2.82	0.47	2.64	12.74	0.67	13.55
45	5.04	0.65	0.21	0.08	0.04	0.81	0.30	2.99	0.50	2.79	13.41	0.71	14.27
50	5.37	0.67	0.23	0.08	0.04	0.81	0.30	3.18	0.53	2.97	14.18	0.75	15.08

Table VOC HCV 39
Economic Cost of Operation of Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness_s = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.34	0.49	0.11	0.08	0.03	0.93	0.34	1.98	0.33	1.85	9.48	0.47	10.12
5	3.46	0.51	0.12	0.08	0.03	0.93	0.34	2.06	0.34	1.92	9.81	0.49	10.46
10	3.60	0.52	0.13	0.08	0.03	0.93	0.34	2.15	0.36	2.00	10.16	0.51	10.83
15	3.76	0.54	0.14	0.08	0.03	0.93	0.34	2.24	0.38	2.09	10.55	0.53	11.24
20	3.93	0.56	0.16	0.08	0.04	0.93	0.34	2.35	0.39	2.19	10.97	0.56	11.69
25	4.11	0.57	0.17	0.08	0.04	0.93	0.34	2.46	0.41	2.30	11.43	0.58	12.18
30	4.32	0.59	0.18	0.08	0.04	0.93	0.34	2.59	0.43	2.42	11.94	0.61	12.72
35	4.56	0.61	0.19	0.08	0.04	0.93	0.34	2.73	0.46	2.55	12.50	0.65	13.31
40	4.83	0.63	0.20	0.08	0.04	0.93	0.34	2.89	0.48	2.70	13.13	0.68	13.98
45	5.13	0.66	0.21	0.08	0.05	0.93	0.34	3.06	0.51	2.86	13.85	0.73	14.74
50	5.48	0.68	0.23	0.08	0.05	0.93	0.34	3.26	0.55	3.05	14.65	0.77	15.59

Table VOC HCV 40
Economic Cost of Operation of Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.35	0.50	0.11	0.09	0.03	1.07	0.40	2.01	0.34	1.88	9.77	0.48	10.44
5	3.48	0.52	0.12	0.09	0.03	1.07	0.40	2.09	0.35	1.95	10.11	0.50	10.79
10	3.63	0.53	0.13	0.09	0.04	1.07	0.40	2.18	0.37	2.04	10.47	0.52	11.18
15	3.79	0.55	0.14	0.09	0.04	1.07	0.40	2.28	0.38	2.13	10.87	0.54	11.60
20	3.96	0.57	0.16	0.09	0.04	1.07	0.40	2.39	0.40	2.23	11.31	0.57	12.06
25	4.16	0.58	0.17	0.09	0.04	1.07	0.40	2.51	0.42	2.34	11.79	0.59	12.57
30	4.38	0.60	0.18	0.09	0.04	1.07	0.40	2.64	0.44	2.47	12.32	0.63	13.13
35	4.63	0.62	0.19	0.09	0.05	1.07	0.40	2.79	0.47	2.61	12.91	0.66	13.76
40	4.91	0.65	0.20	0.09	0.05	1.07	0.40	2.96	0.50	2.76	13.57	0.70	14.46
45	5.23	0.67	0.22	0.09	0.05	1.07	0.40	3.14	0.53	2.93	14.32	0.74	15.25
50	5.60	0.70	0.23	0.09	0.05	1.07	0.40	3.35	0.56	3.13	15.17	0.79	16.15

Table VOC HCV 41
Economic Cost of Operation of Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	3.37	0.51	0.11	0.09	0.04	1.23	0.46	2.04	0.34	1.91	10.09	0.48	10.80
5	3.51	0.52	0.12	0.09	0.04	1.23	0.46	2.13	0.36	1.99	10.44	0.50	11.16
10	3.66	0.54	0.13	0.09	0.04	1.23	0.46	2.22	0.37	2.07	10.82	0.53	11.56
15	3.82	0.56	0.15	0.09	0.04	1.23	0.46	2.33	0.39	2.17	11.23	0.55	12.00
20	4.01	0.58	0.16	0.09	0.04	1.23	0.46	2.44	0.41	2.28	11.68	0.58	12.48
25	4.21	0.59	0.17	0.09	0.04	1.23	0.46	2.56	0.43	2.39	12.18	0.61	13.01
30	4.44	0.62	0.18	0.09	0.05	1.23	0.46	2.70	0.45	2.52	12.74	0.64	13.60
35	4.70	0.64	0.19	0.09	0.05	1.23	0.46	2.85	0.48	2.66	13.35	0.68	14.25
40	4.99	0.66	0.21	0.09	0.05	1.23	0.46	3.03	0.51	2.82	14.05	0.72	14.98
45	5.33	0.69	0.22	0.09	0.05	1.23	0.46	3.22	0.54	3.01	14.84	0.76	15.82
50	5.73	0.71	0.23	0.09	0.05	1.23	0.46	3.44	0.58	3.21	15.74	0.81	16.77

Table VOC HCV 42
Financial Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.15	1.39	0.22	0.13	0.02	1.17	0.43	2.42	0.59	1.97	14.50	0.42	14.91
5	6.43	1.47	0.24	0.13	0.03	1.17	0.43	2.51	0.61	2.05	15.06	0.43	15.50
10	6.73	1.55	0.27	0.13	0.03	1.17	0.43	2.60	0.63	2.12	15.67	0.45	16.12
15	7.06	1.65	0.29	0.13	0.03	1.17	0.43	2.70	0.66	2.20	16.33	0.47	16.80
20	7.40	1.77	0.32	0.13	0.04	1.17	0.43	2.81	0.68	2.29	17.04	0.49	17.53
25	7.78	1.90	0.34	0.13	0.04	1.17	0.43	2.92	0.71	2.39	17.82	0.51	18.33
30	8.18	2.05	0.37	0.13	0.05	1.17	0.43	3.05	0.74	2.49	18.67	0.53	19.20
35	8.63	2.23	0.39	0.13	0.05	1.17	0.43	3.19	0.78	2.61	19.61	0.55	20.16
40	9.11	2.45	0.41	0.13	0.05	1.17	0.43	3.34	0.81	2.73	20.65	0.58	21.23
45	9.65	2.71	0.44	0.13	0.06	1.17	0.43	3.51	0.85	2.87	21.82	0.61	22.43
50	10.25	3.03	0.46	0.13	0.06	1.17	0.43	3.70	0.90	3.02	23.15	0.64	23.79

Table VOC HCV 43
Financial Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.19	1.43	0.23	0.14	0.03	1.35	0.50	2.45	0.60	2.00	14.92	0.42	15.34
5	6.48	1.51	0.25	0.14	0.03	1.35	0.50	2.54	0.62	2.08	15.50	0.44	15.94
10	6.79	1.61	0.28	0.14	0.04	1.35	0.50	2.64	0.64	2.15	16.13	0.46	16.59
15	7.12	1.72	0.30	0.14	0.04	1.35	0.50	2.74	0.67	2.24	16.81	0.47	17.29
20	7.48	1.84	0.33	0.14	0.04	1.35	0.50	2.85	0.69	2.33	17.55	0.49	18.05
25	7.87	1.98	0.35	0.14	0.05	1.35	0.50	2.97	0.72	2.43	18.36	0.51	18.88
30	8.29	2.15	0.37	0.14	0.05	1.35	0.50	3.11	0.75	2.54	19.25	0.54	19.79
35	8.75	2.35	0.40	0.14	0.06	1.35	0.50	3.25	0.79	2.65	20.23	0.56	20.79
40	9.25	2.58	0.42	0.14	0.06	1.35	0.50	3.41	0.83	2.78	21.33	0.59	21.92
45	9.81	2.87	0.45	0.14	0.06	1.35	0.50	3.58	0.87	2.93	22.56	0.62	23.18
50	10.44	3.24	0.47	0.14	0.07	1.35	0.50	3.78	0.92	3.08	23.98	0.65	24.64

Table VOC HCV 44
Financial Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.24	1.47	0.24	0.15	0.04	1.55	0.57	2.49	0.60	2.03	15.38	0.43	15.81
5	6.54	1.56	0.26	0.15	0.04	1.55	0.57	2.58	0.63	2.11	15.99	0.45	16.43
10	6.86	1.67	0.29	0.15	0.04	1.55	0.57	2.68	0.65	2.19	16.64	0.46	17.10
15	7.20	1.78	0.31	0.15	0.05	1.55	0.57	2.78	0.68	2.27	17.34	0.48	17.83
20	7.57	1.92	0.34	0.15	0.05	1.55	0.57	2.90	0.70	2.37	18.11	0.50	18.61
25	7.97	2.07	0.36	0.15	0.06	1.55	0.57	3.03	0.74	2.47	18.95	0.52	19.48
30	8.40	2.25	0.38	0.15	0.06	1.55	0.57	3.16	0.77	2.58	19.88	0.55	20.43
35	8.88	2.47	0.41	0.15	0.06	1.55	0.57	3.31	0.80	2.70	20.91	0.57	21.48
40	9.40	2.74	0.43	0.15	0.07	1.55	0.57	3.48	0.84	2.84	22.07	0.60	22.67
45	9.99	3.06	0.46	0.15	0.07	1.55	0.57	3.66	0.89	2.99	23.39	0.63	24.02
50	10.65	3.48	0.48	0.15	0.07	1.55	0.57	3.86	0.94	3.15	24.91	0.67	25.57

Table VOC HCV 45
Financial Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.29	1.52	0.25	0.15	0.04	1.79	0.66	2.52	0.61	2.06	15.90	0.44	16.33
5	6.60	1.62	0.27	0.15	0.05	1.79	0.66	2.62	0.64	2.14	16.52	0.45	16.97
10	6.92	1.73	0.30	0.15	0.05	1.79	0.66	2.72	0.66	2.22	17.20	0.47	17.67
15	7.28	1.85	0.32	0.15	0.05	1.79	0.66	2.83	0.69	2.31	17.93	0.49	18.42
20	7.66	2.00	0.34	0.15	0.06	1.79	0.66	2.95	0.72	2.41	18.73	0.51	19.24
25	8.07	2.17	0.37	0.15	0.06	1.79	0.66	3.08	0.75	2.51	19.61	0.53	20.14
30	8.52	2.37	0.39	0.15	0.07	1.79	0.66	3.22	0.78	2.63	20.58	0.56	21.14
35	9.02	2.61	0.42	0.15	0.07	1.79	0.66	3.38	0.82	2.76	21.66	0.58	22.25
40	9.56	2.91	0.44	0.15	0.07	1.79	0.66	3.55	0.86	2.90	22.89	0.61	23.50
45	10.18	3.28	0.47	0.15	0.08	1.79	0.66	3.74	0.91	3.05	24.29	0.65	24.94
50	10.87	3.76	0.49	0.15	0.08	1.79	0.66	3.95	0.96	3.22	25.93	0.68	26.61

Table VOC HCV 46
Financial Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.34	1.57	0.26	0.16	0.05	2.06	0.76	2.56	0.62	2.09	16.47	0.44	16.91
5	6.66	1.68	0.28	0.16	0.05	2.06	0.76	2.66	0.65	2.17	17.12	0.46	17.58
10	6.99	1.80	0.31	0.16	0.06	2.06	0.76	2.76	0.67	2.26	17.82	0.48	18.29
15	7.36	1.93	0.33	0.16	0.06	2.06	0.76	2.88	0.70	2.35	18.58	0.50	19.07
20	7.75	2.09	0.35	0.16	0.06	2.06	0.76	3.00	0.73	2.45	19.41	0.52	19.93
25	8.18	2.27	0.38	0.16	0.07	2.06	0.76	3.13	0.76	2.56	20.33	0.54	20.87
30	8.65	2.50	0.40	0.16	0.07	2.06	0.76	3.28	0.80	2.68	21.35	0.57	21.92
35	9.16	2.77	0.43	0.16	0.08	2.06	0.76	3.44	0.84	2.81	22.49	0.60	23.09
40	9.73	3.10	0.45	0.16	0.08	2.06	0.76	3.62	0.88	2.96	23.80	0.63	24.42
45	10.38	3.53	0.48	0.16	0.08	2.06	0.76	3.82	0.93	3.12	25.30	0.66	25.96
50	11.11	4.10	0.50	0.16	0.09	2.06	0.76	4.04	0.98	3.30	27.08	0.70	27.78

Table VOC HCV 47
Financial Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.40	1.63	0.27	0.16	0.06	2.37	0.87	2.60	0.63	2.12	17.11	0.45	17.56
5	6.72	1.74	0.29	0.16	0.06	2.37	0.87	2.70	0.66	2.20	17.78	0.47	18.24
10	7.07	1.87	0.31	0.16	0.06	2.37	0.87	2.81	0.68	2.29	18.50	0.49	18.99
15	7.44	2.02	0.34	0.16	0.07	2.37	0.87	2.92	0.71	2.39	19.29	0.51	19.80
20	7.85	2.19	0.36	0.16	0.07	2.37	0.87	3.05	0.74	2.49	20.16	0.53	20.69
25	8.29	2.39	0.39	0.16	0.08	2.37	0.87	3.19	0.78	2.60	21.13	0.55	21.68
30	8.78	2.64	0.41	0.16	0.08	2.37	0.87	3.34	0.81	2.73	22.20	0.58	22.78
35	9.31	2.94	0.44	0.16	0.08	2.37	0.87	3.51	0.85	2.87	23.41	0.61	24.02
40	9.91	3.33	0.46	0.16	0.09	2.37	0.87	3.70	0.90	3.02	24.81	0.64	25.45
45	10.59	3.82	0.49	0.16	0.09	2.37	0.87	3.90	0.95	3.19	26.43	0.67	27.11
50	11.36	4.50	0.51	0.16	0.09	2.37	0.87	4.13	1.00	3.37	28.38	0.71	29.09

Table VOC HCV 48
Financial Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.46	1.69	0.28	0.17	0.06	2.73	1.01	2.64	0.64	2.15	17.82	0.46	18.28
5	6.79	1.81	0.30	0.17	0.07	2.73	1.01	2.74	0.67	2.24	18.51	0.47	18.99
10	7.15	1.95	0.32	0.17	0.07	2.73	1.01	2.85	0.69	2.33	19.27	0.49	19.76
15	7.53	2.11	0.35	0.17	0.07	2.73	1.01	2.97	0.72	2.43	20.09	0.51	20.61
20	7.96	2.30	0.37	0.17	0.08	2.73	1.01	3.11	0.75	2.54	21.00	0.54	21.54
25	8.41	2.52	0.40	0.17	0.08	2.73	1.01	3.25	0.79	2.65	22.01	0.56	22.57
30	8.92	2.80	0.42	0.17	0.09	2.73	1.01	3.41	0.83	2.78	23.15	0.59	23.74
35	9.48	3.14	0.45	0.17	0.09	2.73	1.01	3.58	0.87	2.92	24.44	0.62	25.06
40	10.11	3.58	0.47	0.17	0.09	2.73	1.01	3.78	0.92	3.08	25.93	0.65	26.59
45	10.82	4.17	0.49	0.17	0.10	2.73	1.01	3.99	0.97	3.26	27.70	0.69	28.39
50	11.64	4.98	0.52	0.17	0.10	2.73	1.01	4.23	1.03	3.46	29.86	0.73	30.59

Table VOC HCV 49
Financial Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.52	1.75	0.28	0.18	0.07	3.14	1.16	2.68	0.65	2.19	18.62	0.46	19.08
5	6.86	1.88	0.31	0.18	0.07	3.14	1.16	2.78	0.68	2.27	19.34	0.48	19.82
10	7.23	2.03	0.33	0.18	0.08	3.14	1.16	2.90	0.70	2.37	20.12	0.50	20.62
15	7.63	2.21	0.36	0.18	0.08	3.14	1.16	3.02	0.73	2.47	20.98	0.52	21.51
20	8.07	2.42	0.38	0.18	0.08	3.14	1.16	3.16	0.77	2.58	21.94	0.55	22.48
25	8.54	2.67	0.41	0.18	0.09	3.14	1.16	3.31	0.80	2.70	23.00	0.57	23.57
30	9.07	2.98	0.43	0.18	0.09	3.14	1.16	3.48	0.84	2.84	24.20	0.60	24.81
35	9.65	3.37	0.46	0.18	0.10	3.14	1.16	3.66	0.89	2.99	25.58	0.63	26.22
40	10.31	3.88	0.48	0.18	0.10	3.14	1.16	3.86	0.94	3.15	27.20	0.67	27.87
45	11.06	4.58	0.50	0.18	0.10	3.14	1.16	4.08	0.99	3.33	29.14	0.71	29.84
50	11.93	5.58	0.53	0.18	0.11	3.14	1.16	4.34	1.05	3.54	31.56	0.75	32.31

Table VOC HCV 50
Financial Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.59	1.82	0.29	0.18	0.08	3.62	1.33	2.72	0.66	2.22	19.51	0.47	19.98
5	6.94	1.96	0.32	0.18	0.08	3.62	1.33	2.83	0.69	2.31	20.26	0.49	20.75
10	7.32	2.13	0.34	0.18	0.08	3.62	1.33	2.95	0.72	2.41	21.08	0.51	21.59
15	7.73	2.32	0.37	0.18	0.09	3.62	1.33	3.08	0.75	2.51	21.98	0.53	22.51
20	8.18	2.55	0.39	0.18	0.09	3.62	1.33	3.22	0.78	2.63	22.98	0.56	23.54
25	8.68	2.83	0.42	0.18	0.09	3.62	1.33	3.37	0.82	2.75	24.11	0.58	24.69
30	9.23	3.18	0.44	0.18	0.10	3.62	1.33	3.55	0.86	2.89	25.39	0.61	26.00
35	9.84	3.64	0.46	0.18	0.10	3.62	1.33	3.73	0.91	3.05	26.87	0.65	27.52
40	10.53	4.24	0.49	0.18	0.11	3.62	1.33	3.95	0.96	3.22	28.63	0.68	29.31
45	11.33	5.08	0.51	0.18	0.11	3.62	1.33	4.18	1.02	3.41	30.78	0.72	31.50
50	12.25	6.35	0.54	0.18	0.11	3.62	1.33	4.45	1.08	3.63	33.54	0.77	34.31

Table VOC HCV 51
Financial Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 11000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.66	1.90	0.30	0.19	0.08	4.16	1.54	2.76	0.67	2.25	20.52	0.48	21.00
5	7.02	2.05	0.33	0.19	0.09	4.16	1.54	2.88	0.70	2.35	21.30	0.50	21.79
10	7.42	2.23	0.35	0.19	0.09	4.16	1.54	3.00	0.73	2.45	22.15	0.52	22.67
15	7.84	2.44	0.38	0.19	0.09	4.16	1.54	3.13	0.76	2.56	23.09	0.54	23.64
20	8.31	2.70	0.40	0.19	0.10	4.16	1.54	3.28	0.80	2.68	24.15	0.57	24.72
25	8.82	3.02	0.42	0.19	0.10	4.16	1.54	3.44	0.84	2.81	25.34	0.60	25.94
30	9.40	3.42	0.45	0.19	0.11	4.16	1.54	3.62	0.88	2.95	26.71	0.63	27.34
35	10.04	3.95	0.47	0.19	0.11	4.16	1.54	3.82	0.93	3.12	28.32	0.66	28.98
40	10.77	4.67	0.50	0.19	0.11	4.16	1.54	4.04	0.98	3.30	30.25	0.70	30.95
45	11.61	5.71	0.52	0.19	0.12	4.16	1.54	4.28	1.04	3.50	32.67	0.74	33.41
50	12.60	7.35	0.55	0.19	0.12	4.16	1.54	4.56	1.11	3.72	35.91	0.79	36.70

Table VOC HCV 52
Financial Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 12000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.73	1.98	0.31	0.20	0.09	4.79	1.77	2.81	0.68	2.29	21.65	0.49	22.14
5	7.11	2.14	0.34	0.20	0.09	4.79	1.77	2.92	0.71	2.39	22.46	0.51	22.97
10	7.51	2.34	0.36	0.20	0.10	4.79	1.77	3.05	0.74	2.49	23.35	0.53	23.88
15	7.96	2.58	0.39	0.20	0.10	4.79	1.77	3.19	0.78	2.60	24.35	0.55	24.90
20	8.44	2.86	0.41	0.20	0.10	4.79	1.77	3.34	0.81	2.73	25.46	0.58	26.04
25	8.98	3.23	0.43	0.20	0.11	4.79	1.77	3.51	0.85	2.87	26.73	0.61	27.34
30	9.58	3.69	0.46	0.20	0.11	4.79	1.77	3.69	0.90	3.02	28.21	0.64	28.85
35	10.25	4.31	0.48	0.20	0.12	4.79	1.77	3.90	0.95	3.18	29.96	0.67	30.63
40	11.02	5.19	0.51	0.20	0.12	4.79	1.77	4.13	1.00	3.37	32.11	0.71	32.82
45	11.92	6.51	0.53	0.20	0.12	4.79	1.77	4.39	1.07	3.58	34.89	0.76	35.65
50	12.99	8.74	0.56	0.20	0.13	4.79	1.77	4.68	1.14	3.82	38.82	0.81	39.63

Table VOC HCV 53
Financial Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 13000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.81	2.07	0.32	0.20	0.10	5.52	2.04	2.85	0.69	2.33	22.93	0.49	23.42
5	7.20	2.25	0.35	0.20	0.10	5.52	2.04	2.97	0.72	2.43	23.77	0.51	24.29
10	7.62	2.46	0.37	0.20	0.10	5.52	2.04	3.10	0.75	2.53	24.71	0.54	25.25
15	8.08	2.73	0.39	0.20	0.11	5.52	2.04	3.25	0.79	2.65	25.76	0.56	26.32
20	8.58	3.05	0.42	0.20	0.11	5.52	2.04	3.41	0.83	2.78	26.94	0.59	27.53
25	9.14	3.47	0.44	0.20	0.11	5.52	2.04	3.58	0.87	2.92	28.30	0.62	28.92
30	9.77	4.01	0.47	0.20	0.12	5.52	2.04	3.77	0.92	3.08	29.90	0.65	30.55
35	10.48	4.76	0.49	0.20	0.12	5.52	2.04	3.99	0.97	3.26	31.83	0.69	32.52
40	11.30	5.85	0.52	0.20	0.13	5.52	2.04	4.23	1.03	3.45	34.26	0.73	34.99
45	12.26	7.58	0.54	0.20	0.13	5.52	2.04	4.50	1.09	3.68	37.54	0.78	38.32
50	13.41	10.78	0.57	0.20	0.13	5.52	2.04	4.81	1.17	3.93	42.55	0.83	43.38

Table VOC HCV 54
Financial Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 14000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.90	2.16	0.33	0.21	0.10	6.35	2.35	2.90	0.70	2.37	24.37	0.50	24.87
5	7.30	2.36	0.36	0.21	0.11	6.35	2.35	3.02	0.73	2.47	25.26	0.52	25.78
10	7.73	2.60	0.38	0.21	0.11	6.35	2.35	3.16	0.77	2.58	26.24	0.55	26.79
15	8.21	2.90	0.40	0.21	0.11	6.35	2.35	3.31	0.80	2.70	27.35	0.57	27.92
20	8.73	3.27	0.43	0.21	0.12	6.35	2.35	3.47	0.84	2.84	28.61	0.60	29.21
25	9.32	3.75	0.45	0.21	0.12	6.35	2.35	3.66	0.89	2.98	30.08	0.63	30.71
30	9.98	4.39	0.48	0.21	0.13	6.35	2.35	3.86	0.94	3.15	31.82	0.67	32.49
35	10.73	5.30	0.50	0.21	0.13	6.35	2.35	4.08	0.99	3.33	33.98	0.71	34.68
40	11.59	6.69	0.53	0.21	0.13	6.35	2.35	4.34	1.05	3.54	36.78	0.75	37.53
45	12.62	9.07	0.55	0.21	0.14	6.35	2.35	4.62	1.12	3.77	40.80	0.80	41.60
50	13.87	14.05	0.57	0.21	0.14	6.35	2.35	4.95	1.20	4.04	47.73	0.86	48.59

Table VOC HCV 55
Financial Cost of Operation of Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 15000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.99	2.27	0.34	0.22	0.11	7.32	2.70	2.95	0.72	2.41	26.01	0.51	26.52
5	7.40	2.49	0.36	0.22	0.11	7.32	2.70	3.08	0.75	2.51	26.94	0.53	27.47
10	7.85	2.76	0.39	0.22	0.12	7.32	2.70	3.22	0.78	2.63	27.98	0.56	28.53
15	8.34	3.09	0.41	0.22	0.12	7.32	2.70	3.37	0.82	2.75	29.15	0.58	29.73
20	8.89	3.52	0.44	0.22	0.12	7.32	2.70	3.54	0.86	2.89	30.50	0.61	31.12
25	9.50	4.08	0.46	0.22	0.13	7.32	2.70	3.73	0.91	3.05	32.10	0.65	32.74
30	10.20	4.85	0.49	0.22	0.13	7.32	2.70	3.94	0.96	3.22	34.02	0.68	34.71
35	10.99	5.99	0.51	0.22	0.14	7.32	2.70	4.18	1.02	3.41	36.47	0.72	37.19
40	11.92	7.82	0.54	0.22	0.14	7.32	2.70	4.45	1.08	3.63	39.80	0.77	40.57
45	13.02	11.27	0.56	0.22	0.14	7.32	2.70	4.75	1.15	3.88	45.01	0.82	45.83
50	14.38	20.17	0.58	0.22	0.15	7.32	2.70	5.09	1.24	4.16	56.00	0.88	56.88

Table VOC HCV 56
Financial Cost of Operation of Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.19	1.16	0.21	0.13	0.02	0.87	0.32	2.25	0.55	1.83	13.54	0.39	13.93
5	6.43	1.22	0.24	0.13	0.03	0.87	0.32	2.33	0.57	1.90	14.03	0.40	14.44
10	6.70	1.28	0.26	0.13	0.03	0.87	0.32	2.42	0.59	1.97	14.57	0.42	14.98
15	6.98	1.35	0.29	0.13	0.03	0.87	0.32	2.51	0.61	2.05	15.14	0.43	15.57
20	7.28	1.42	0.31	0.13	0.04	0.87	0.32	2.61	0.64	2.13	15.76	0.45	16.21
25	7.62	1.50	0.34	0.13	0.04	0.87	0.32	2.73	0.66	2.23	16.44	0.47	16.91
30	7.98	1.60	0.36	0.13	0.05	0.87	0.32	2.85	0.69	2.33	17.17	0.49	17.67
35	8.38	1.70	0.38	0.13	0.05	0.87	0.32	2.98	0.72	2.43	17.98	0.52	18.50
40	8.82	1.83	0.41	0.13	0.05	0.87	0.32	3.13	0.76	2.55	18.87	0.54	19.42
45	9.31	1.97	0.43	0.13	0.06	0.87	0.32	3.29	0.80	2.69	19.86	0.57	20.43
50	9.85	2.13	0.46	0.13	0.06	0.87	0.32	3.47	0.84	2.83	20.97	0.60	21.57

Table VOC HCV 57
Financial Cost of Operation of Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.22	1.19	0.22	0.14	0.03	1.00	0.37	2.28	0.55	1.86	13.86	0.39	14.26
5	6.47	1.25	0.24	0.14	0.03	1.00	0.37	2.36	0.57	1.93	14.37	0.41	14.78
10	6.74	1.31	0.27	0.14	0.04	1.00	0.37	2.45	0.60	2.00	14.92	0.42	15.35
15	7.03	1.39	0.29	0.14	0.04	1.00	0.37	2.55	0.62	2.08	15.52	0.44	15.96
20	7.35	1.46	0.32	0.14	0.04	1.00	0.37	2.66	0.65	2.17	16.16	0.46	16.62
25	7.69	1.55	0.34	0.14	0.05	1.00	0.37	2.77	0.67	2.26	16.86	0.48	17.34
30	8.07	1.65	0.37	0.14	0.05	1.00	0.37	2.90	0.70	2.37	17.63	0.50	18.13
35	8.48	1.77	0.39	0.14	0.06	1.00	0.37	3.04	0.74	2.48	18.47	0.53	18.99
40	8.94	1.90	0.41	0.14	0.06	1.00	0.37	3.19	0.78	2.61	19.40	0.55	19.95
45	9.45	2.05	0.44	0.14	0.06	1.00	0.37	3.36	0.82	2.74	20.44	0.58	21.02
50	10.02	2.23	0.46	0.14	0.07	1.00	0.37	3.55	0.86	2.90	21.60	0.61	22.22

Table VOC HCV 58
Financial Cost of Operation of Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.25	1.22	0.23	0.15	0.04	1.15	0.43	2.31	0.56	1.89	14.22	0.40	14.62
5	6.51	1.28	0.25	0.15	0.04	1.15	0.43	2.40	0.58	1.96	14.75	0.41	15.16
10	6.79	1.35	0.27	0.15	0.04	1.15	0.43	2.49	0.61	2.03	15.31	0.43	15.74
15	7.09	1.43	0.30	0.15	0.05	1.15	0.43	2.59	0.63	2.12	15.93	0.45	16.38
20	7.41	1.51	0.32	0.15	0.05	1.15	0.43	2.70	0.66	2.21	16.59	0.47	17.06
25	7.77	1.61	0.35	0.15	0.06	1.15	0.43	2.82	0.69	2.30	17.32	0.49	17.81
30	8.16	1.72	0.37	0.15	0.06	1.15	0.43	2.95	0.72	2.41	18.12	0.51	18.63
35	8.59	1.84	0.40	0.15	0.06	1.15	0.43	3.10	0.75	2.53	19.00	0.54	19.53
40	9.07	1.98	0.42	0.15	0.07	1.15	0.43	3.26	0.79	2.66	19.97	0.56	20.53
45	9.61	2.15	0.45	0.15	0.07	1.15	0.43	3.43	0.83	2.80	21.06	0.59	21.65
50	10.21	2.35	0.47	0.15	0.07	1.15	0.43	3.63	0.88	2.96	22.29	0.63	22.92

Table VOC HCV 59
Financial Cost of Operation of Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.28	1.26	0.23	0.15	0.04	1.33	0.49	2.34	0.57	1.91	14.61	0.41	15.02
5	6.55	1.32	0.26	0.15	0.05	1.33	0.49	2.43	0.59	1.99	15.16	0.42	15.58
10	6.84	1.39	0.28	0.15	0.05	1.33	0.49	2.53	0.61	2.07	15.74	0.44	16.18
15	7.15	1.47	0.31	0.15	0.05	1.33	0.49	2.64	0.64	2.15	16.38	0.46	16.84
20	7.49	1.56	0.33	0.15	0.06	1.33	0.49	2.75	0.67	2.24	17.07	0.48	17.55
25	7.86	1.67	0.35	0.15	0.06	1.33	0.49	2.87	0.70	2.35	17.83	0.50	18.32
30	8.26	1.78	0.38	0.15	0.07	1.33	0.49	3.01	0.73	2.46	18.66	0.52	19.18
35	8.71	1.92	0.40	0.15	0.07	1.33	0.49	3.16	0.77	2.58	19.58	0.55	20.12
40	9.21	2.07	0.43	0.15	0.07	1.33	0.49	3.32	0.81	2.71	20.60	0.57	21.17
45	9.77	2.25	0.45	0.15	0.08	1.33	0.49	3.51	0.85	2.86	21.74	0.61	22.35
50	10.40	2.47	0.48	0.15	0.08	1.33	0.49	3.71	0.90	3.03	23.04	0.64	23.69

Table VOC HCV 60
Financial Cost of Operation of Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.32	1.29	0.24	0.16	0.05	1.53	0.56	2.38	0.58	1.94	15.05	0.41	15.46
5	6.59	1.36	0.26	0.16	0.05	1.53	0.56	2.47	0.60	2.02	15.61	0.43	16.04
10	6.89	1.44	0.29	0.16	0.06	1.53	0.56	2.57	0.62	2.10	16.22	0.44	16.66
15	7.21	1.52	0.31	0.16	0.06	1.53	0.56	2.68	0.65	2.19	16.88	0.46	17.34
20	7.56	1.62	0.34	0.16	0.06	1.53	0.56	2.80	0.68	2.28	17.60	0.48	18.08
25	7.95	1.73	0.36	0.16	0.07	1.53	0.56	2.93	0.71	2.39	18.38	0.51	18.89
30	8.37	1.85	0.39	0.16	0.07	1.53	0.56	3.07	0.75	2.50	19.25	0.53	19.78
35	8.84	2.00	0.41	0.16	0.08	1.53	0.56	3.22	0.78	2.63	20.21	0.56	20.77
40	9.36	2.17	0.43	0.16	0.08	1.53	0.56	3.39	0.82	2.77	21.28	0.59	21.87
45	9.95	2.37	0.46	0.16	0.08	1.53	0.56	3.59	0.87	2.93	22.49	0.62	23.11
50	10.61	2.61	0.48	0.16	0.09	1.53	0.56	3.80	0.92	3.10	23.87	0.66	24.53

Table VOC HCV 61
Financial Cost of Operation of Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.36	1.33	0.25	0.16	0.06	1.76	0.65	2.41	0.59	1.97	15.54	0.42	15.96
5	6.64	1.40	0.27	0.16	0.06	1.76	0.65	2.51	0.61	2.05	16.12	0.43	16.55
10	6.95	1.48	0.29	0.16	0.06	1.76	0.65	2.61	0.64	2.13	16.75	0.45	17.20
15	7.28	1.57	0.32	0.16	0.07	1.76	0.65	2.73	0.66	2.22	17.43	0.47	17.90
20	7.65	1.68	0.34	0.16	0.07	1.76	0.65	2.85	0.69	2.32	18.18	0.49	18.67
25	8.05	1.79	0.37	0.16	0.08	1.76	0.65	2.98	0.72	2.43	19.00	0.52	19.51
30	8.48	1.93	0.39	0.16	0.08	1.76	0.65	3.13	0.76	2.55	19.90	0.54	20.44
35	8.97	2.09	0.42	0.16	0.08	1.76	0.65	3.29	0.80	2.69	20.91	0.57	21.48
40	9.52	2.27	0.44	0.16	0.09	1.76	0.65	3.47	0.84	2.83	22.04	0.60	22.64
45	10.13	2.50	0.46	0.16	0.09	1.76	0.65	3.67	0.89	2.99	23.31	0.63	23.95
50	10.84	2.77	0.49	0.16	0.09	1.76	0.65	3.89	0.95	3.18	24.78	0.67	25.46

Table VOC HCV 62
Financial Cost of Operation of Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.40	1.37	0.25	0.17	0.06	2.03	0.75	2.45	0.60	2.00	16.08	0.42	16.51
5	6.70	1.44	0.28	0.17	0.07	2.03	0.75	2.55	0.62	2.08	16.68	0.44	17.12
10	7.01	1.53	0.30	0.17	0.07	2.03	0.75	2.66	0.65	2.17	17.33	0.46	17.79
15	7.36	1.63	0.32	0.17	0.07	2.03	0.75	2.77	0.67	2.26	18.04	0.48	18.52
20	7.73	1.74	0.35	0.17	0.08	2.03	0.75	2.90	0.70	2.37	18.82	0.50	19.32
25	8.15	1.87	0.37	0.17	0.08	2.03	0.75	3.04	0.74	2.48	19.67	0.53	20.20
30	8.61	2.01	0.40	0.17	0.09	2.03	0.75	3.19	0.78	2.60	20.62	0.55	21.17
35	9.12	2.19	0.42	0.17	0.09	2.03	0.75	3.36	0.82	2.74	21.68	0.58	22.26
40	9.69	2.39	0.45	0.17	0.09	2.03	0.75	3.55	0.86	2.89	22.87	0.61	23.48
45	10.34	2.64	0.47	0.17	0.10	2.03	0.75	3.75	0.91	3.07	24.22	0.65	24.87
50	11.09	2.94	0.50	0.17	0.10	2.03	0.75	3.99	0.97	3.26	25.79	0.69	26.48

Table VOC HCV 63
Financial Cost of Operation of Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.45	1.41	0.26	0.18	0.07	2.33	0.86	2.49	0.61	2.03	16.69	0.43	17.12
5	6.75	1.49	0.28	0.18	0.07	2.33	0.86	2.59	0.63	2.12	17.31	0.45	17.76
10	7.08	1.58	0.31	0.18	0.08	2.33	0.86	2.70	0.66	2.21	17.99	0.47	18.45
15	7.44	1.69	0.33	0.18	0.08	2.33	0.86	2.82	0.69	2.30	18.72	0.49	19.21
20	7.83	1.81	0.36	0.18	0.08	2.33	0.86	2.95	0.72	2.41	19.53	0.51	20.04
25	8.26	1.95	0.38	0.18	0.09	2.33	0.86	3.10	0.75	2.53	20.42	0.54	20.96
30	8.74	2.11	0.40	0.18	0.09	2.33	0.86	3.25	0.79	2.66	21.41	0.56	21.96
35	9.27	2.29	0.43	0.18	0.10	2.33	0.86	3.43	0.83	2.80	22.53	0.59	23.12
40	9.87	2.52	0.45	0.18	0.10	2.33	0.86	3.63	0.88	2.96	23.78	0.63	24.41
45	10.56	2.80	0.48	0.18	0.10	2.33	0.86	3.84	0.93	3.14	25.23	0.67	25.89
50	11.35	3.14	0.50	0.18	0.11	2.33	0.86	4.09	0.99	3.34	26.90	0.71	27.61

Table VOC HCV 64
Financial Cost of Operation of Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.50	1.45	0.26	0.18	0.08	2.69	0.99	2.53	0.61	2.07	17.37	0.44	17.81
5	6.81	1.54	0.29	0.18	0.08	2.69	0.99	2.63	0.64	2.15	18.01	0.46	18.47
10	7.15	1.64	0.31	0.18	0.08	2.69	0.99	2.75	0.67	2.24	18.71	0.48	19.19
15	7.52	1.75	0.34	0.18	0.09	2.69	0.99	2.87	0.70	2.35	19.48	0.50	19.98
20	7.93	1.88	0.36	0.18	0.09	2.69	0.99	3.01	0.73	2.46	20.32	0.52	20.84
25	8.38	2.03	0.39	0.18	0.09	2.69	0.99	3.16	0.77	2.58	21.25	0.55	21.80
30	8.87	2.21	0.41	0.18	0.10	2.69	0.99	3.32	0.81	2.71	22.30	0.57	22.87
35	9.43	2.41	0.43	0.18	0.10	2.69	0.99	3.51	0.85	2.86	23.47	0.61	24.07
40	10.07	2.67	0.46	0.18	0.11	2.69	0.99	3.71	0.90	3.03	24.80	0.64	25.44
45	10.79	2.98	0.48	0.18	0.11	2.69	0.99	3.94	0.96	3.22	26.34	0.68	27.02
50	11.64	3.37	0.51	0.18	0.11	2.69	0.99	4.20	1.02	3.43	28.15	0.73	28.87

Table VOC HCV 65
Financial Cost of Operation of Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.27	1.02	0.21	0.13	0.02	0.76	0.28	2.14	0.52	1.74	13.10	0.44	13.54
5	6.48	1.06	0.24	0.13	0.03	0.76	0.28	2.22	0.54	1.81	13.54	0.46	14.00
10	6.71	1.11	0.26	0.13	0.03	0.76	0.28	2.30	0.56	1.88	14.03	0.48	14.50
15	6.97	1.16	0.28	0.13	0.03	0.76	0.28	2.39	0.58	1.95	14.55	0.50	15.04
20	7.25	1.21	0.31	0.13	0.04	0.76	0.28	2.49	0.61	2.04	15.12	0.52	15.63
25	7.55	1.27	0.33	0.13	0.04	0.76	0.28	2.60	0.63	2.12	15.73	0.54	16.27
30	7.89	1.34	0.36	0.13	0.05	0.76	0.28	2.72	0.66	2.22	16.41	0.56	16.97
35	8.26	1.42	0.38	0.13	0.05	0.76	0.28	2.85	0.69	2.33	17.14	0.59	17.73
40	8.66	1.50	0.41	0.13	0.05	0.76	0.28	2.99	0.73	2.44	17.96	0.62	18.58
45	9.12	1.59	0.43	0.13	0.06	0.76	0.28	3.15	0.77	2.57	18.86	0.65	19.51
50	9.63	1.70	0.45	0.13	0.06	0.76	0.28	3.33	0.81	2.71	19.87	0.69	20.55

Table VOC HCV 66
Financial Cost of Operation of Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.29	1.04	0.22	0.14	0.03	0.87	0.32	2.17	0.53	1.77	13.38	0.45	13.82
5	6.51	1.09	0.24	0.14	0.03	0.87	0.32	2.25	0.55	1.84	13.84	0.47	14.30
10	6.75	1.14	0.26	0.14	0.04	0.87	0.32	2.34	0.57	1.91	14.33	0.48	14.82
15	7.01	1.19	0.29	0.14	0.04	0.87	0.32	2.43	0.59	1.99	14.87	0.50	15.38
20	7.30	1.25	0.31	0.14	0.04	0.87	0.32	2.54	0.62	2.07	15.46	0.52	15.99
25	7.61	1.31	0.34	0.14	0.05	0.87	0.32	2.65	0.64	2.16	16.10	0.55	16.65
30	7.96	1.38	0.36	0.14	0.05	0.87	0.32	2.77	0.67	2.26	16.80	0.57	17.37
35	8.35	1.46	0.39	0.14	0.06	0.87	0.32	2.90	0.71	2.37	17.57	0.60	18.17
40	8.77	1.55	0.41	0.14	0.06	0.87	0.32	3.05	0.74	2.49	18.42	0.63	19.05
45	9.25	1.65	0.44	0.14	0.06	0.87	0.32	3.22	0.78	2.63	19.36	0.67	20.03
50	9.79	1.76	0.46	0.14	0.07	0.87	0.32	3.40	0.83	2.78	20.42	0.70	21.12

Table VOC HCV 67
Financial Cost of Operation of Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.31	1.07	0.22	0.15	0.04	1.01	0.37	2.20	0.53	1.80	13.68	0.46	14.14
5	6.53	1.11	0.25	0.15	0.04	1.01	0.37	2.28	0.55	1.86	14.16	0.47	14.63
10	6.78	1.16	0.27	0.15	0.04	1.01	0.37	2.37	0.58	1.94	14.67	0.49	15.16
15	7.06	1.22	0.29	0.15	0.05	1.01	0.37	2.47	0.60	2.02	15.23	0.51	15.74
20	7.35	1.28	0.32	0.15	0.05	1.01	0.37	2.58	0.63	2.10	15.84	0.53	16.37
25	7.68	1.35	0.34	0.15	0.06	1.01	0.37	2.69	0.65	2.20	16.50	0.56	17.06
30	8.04	1.42	0.37	0.15	0.06	1.01	0.37	2.82	0.69	2.30	17.23	0.58	17.81
35	8.44	1.51	0.39	0.15	0.06	1.01	0.37	2.96	0.72	2.42	18.03	0.61	18.64
40	8.89	1.60	0.42	0.15	0.07	1.01	0.37	3.12	0.76	2.54	18.92	0.64	19.56
45	9.39	1.71	0.44	0.15	0.07	1.01	0.37	3.29	0.80	2.68	19.90	0.68	20.58
50	9.95	1.83	0.46	0.15	0.07	1.01	0.37	3.48	0.85	2.84	21.01	0.72	21.73

Table VOC HCV 68
Financial Cost of Operation of Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.33	1.09	0.23	0.15	0.04	1.16	0.43	2.23	0.54	1.82	14.02	0.46	14.49
5	6.56	1.14	0.25	0.15	0.05	1.16	0.43	2.32	0.56	1.89	14.51	0.48	14.99
10	6.82	1.19	0.27	0.15	0.05	1.16	0.43	2.41	0.59	1.97	15.05	0.50	15.55
15	7.10	1.25	0.30	0.15	0.05	1.16	0.43	2.51	0.61	2.05	15.63	0.52	16.15
20	7.41	1.32	0.32	0.15	0.06	1.16	0.43	2.62	0.64	2.14	16.26	0.54	16.80
25	7.76	1.39	0.35	0.15	0.06	1.16	0.43	2.74	0.67	2.24	16.94	0.57	17.51
30	8.13	1.47	0.37	0.15	0.07	1.16	0.43	2.88	0.70	2.35	17.70	0.60	18.29
35	8.55	1.56	0.40	0.15	0.07	1.16	0.43	3.02	0.73	2.47	18.53	0.63	19.16
40	9.01	1.66	0.42	0.15	0.07	1.16	0.43	3.18	0.77	2.60	19.46	0.66	20.12
45	9.54	1.78	0.45	0.15	0.08	1.16	0.43	3.36	0.82	2.74	20.49	0.70	21.19
50	10.13	1.91	0.47	0.15	0.08	1.16	0.43	3.56	0.87	2.91	21.66	0.74	22.40

Table VOC HCV 69
Financial Cost of Operation of Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.35	1.12	0.23	0.16	0.05	1.33	0.49	2.26	0.55	1.85	14.40	0.47	14.87
5	6.60	1.17	0.26	0.16	0.05	1.33	0.49	2.35	0.57	1.92	14.91	0.49	15.40
10	6.87	1.23	0.28	0.16	0.06	1.33	0.49	2.45	0.60	2.00	15.46	0.51	15.97
15	7.16	1.29	0.30	0.16	0.06	1.33	0.49	2.56	0.62	2.09	16.06	0.53	16.59
20	7.48	1.36	0.33	0.16	0.06	1.33	0.49	2.67	0.65	2.18	16.71	0.55	17.27
25	7.83	1.43	0.35	0.16	0.07	1.33	0.49	2.79	0.68	2.28	17.43	0.58	18.01
30	8.23	1.52	0.38	0.16	0.07	1.33	0.49	2.93	0.71	2.39	18.21	0.61	18.82
35	8.66	1.61	0.40	0.16	0.08	1.33	0.49	3.08	0.75	2.52	19.08	0.64	19.72
40	9.15	1.72	0.43	0.16	0.08	1.33	0.49	3.25	0.79	2.65	20.05	0.67	20.73
45	9.70	1.85	0.45	0.16	0.08	1.33	0.49	3.44	0.84	2.81	21.14	0.71	21.85
50	10.33	1.99	0.47	0.16	0.09	1.33	0.49	3.65	0.89	2.98	22.37	0.75	23.13

Table VOC HCV 70
Financial Cost of Operation of Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.38	1.15	0.24	0.16	0.06	1.54	0.57	2.30	0.56	1.88	14.82	0.48	15.30
5	6.63	1.20	0.26	0.16	0.06	1.54	0.57	2.39	0.58	1.95	15.35	0.49	15.84
10	6.91	1.26	0.28	0.16	0.06	1.54	0.57	2.49	0.61	2.03	15.92	0.52	16.43
15	7.22	1.32	0.31	0.16	0.07	1.54	0.57	2.60	0.63	2.12	16.54	0.54	17.08
20	7.55	1.40	0.33	0.16	0.07	1.54	0.57	2.72	0.66	2.22	17.22	0.56	17.78
25	7.92	1.48	0.36	0.16	0.08	1.54	0.57	2.85	0.69	2.32	17.96	0.59	18.55
30	8.33	1.57	0.38	0.16	0.08	1.54	0.57	2.99	0.73	2.44	18.78	0.62	19.40
35	8.78	1.67	0.41	0.16	0.08	1.54	0.57	3.15	0.76	2.57	19.69	0.65	20.34
40	9.29	1.79	0.43	0.16	0.09	1.54	0.57	3.32	0.81	2.71	20.71	0.69	21.39
45	9.87	1.92	0.46	0.16	0.09	1.54	0.57	3.52	0.85	2.87	21.85	0.73	22.58
50	10.53	2.08	0.48	0.16	0.09	1.54	0.57	3.74	0.91	3.05	23.15	0.77	23.92

Table VOC HCV 71
Financial Cost of Operation of Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.41	1.18	0.24	0.17	0.06	1.77	0.65	2.33	0.57	1.91	15.30	0.48	15.78
5	6.68	1.23	0.27	0.17	0.07	1.77	0.65	2.43	0.59	1.98	15.84	0.50	16.34
10	6.96	1.29	0.29	0.17	0.07	1.77	0.65	2.53	0.62	2.07	16.43	0.52	16.95
15	7.28	1.36	0.31	0.17	0.07	1.77	0.65	2.64	0.64	2.16	17.07	0.55	17.62
20	7.63	1.44	0.34	0.17	0.08	1.77	0.65	2.77	0.67	2.26	17.78	0.57	18.35
25	8.01	1.53	0.36	0.17	0.08	1.77	0.65	2.90	0.71	2.37	18.55	0.60	19.15
30	8.43	1.62	0.39	0.17	0.09	1.77	0.65	3.05	0.74	2.49	19.40	0.63	20.04
35	8.91	1.73	0.41	0.17	0.09	1.77	0.65	3.21	0.78	2.62	20.36	0.67	21.02
40	9.45	1.86	0.44	0.17	0.09	1.77	0.65	3.40	0.83	2.77	21.42	0.70	22.12
45	10.06	2.01	0.46	0.17	0.10	1.77	0.65	3.60	0.87	2.94	22.63	0.75	23.37
50	10.76	2.18	0.48	0.17	0.10	1.77	0.65	3.83	0.93	3.13	24.01	0.79	24.80

Table VOC HCV 72
Financial Cost of Operation of Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.45	1.21	0.25	0.18	0.07	2.04	0.75	2.37	0.58	1.94	15.82	0.49	16.31
5	6.72	1.27	0.27	0.18	0.07	2.04	0.75	2.47	0.60	2.02	16.38	0.51	16.89
10	7.02	1.33	0.29	0.18	0.08	2.04	0.75	2.58	0.63	2.10	16.99	0.53	17.53
15	7.35	1.41	0.32	0.18	0.08	2.04	0.75	2.69	0.65	2.20	17.66	0.56	18.22
20	7.71	1.49	0.34	0.18	0.08	2.04	0.75	2.82	0.68	2.30	18.39	0.58	18.98
25	8.11	1.58	0.37	0.18	0.09	2.04	0.75	2.96	0.72	2.42	19.20	0.61	19.81
30	8.55	1.68	0.39	0.18	0.09	2.04	0.75	3.11	0.76	2.54	20.09	0.64	20.74
35	9.05	1.80	0.42	0.18	0.10	2.04	0.75	3.28	0.80	2.68	21.09	0.68	21.77
40	9.61	1.94	0.44	0.18	0.10	2.04	0.75	3.47	0.84	2.84	22.21	0.72	22.93
45	10.26	2.10	0.47	0.18	0.10	2.04	0.75	3.69	0.90	3.01	23.48	0.76	24.25
50	11.01	2.28	0.49	0.18	0.11	2.04	0.75	3.93	0.96	3.21	24.95	0.81	25.76

Table VOC HCV 73
Financial Cost of Operation of Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.49	1.24	0.25	0.18	0.08	2.35	0.87	2.41	0.59	1.97	16.41	0.50	16.91
5	6.77	1.30	0.27	0.18	0.08	2.35	0.87	2.51	0.61	2.05	16.99	0.52	17.51
10	7.08	1.37	0.30	0.18	0.08	2.35	0.87	2.62	0.64	2.14	17.63	0.54	18.17
15	7.42	1.45	0.32	0.18	0.09	2.35	0.87	2.74	0.67	2.24	18.32	0.57	18.89
20	7.79	1.54	0.35	0.18	0.09	2.35	0.87	2.87	0.70	2.34	19.08	0.59	19.68
25	8.21	1.63	0.37	0.18	0.09	2.35	0.87	3.02	0.73	2.46	19.92	0.62	20.55
30	8.67	1.75	0.40	0.18	0.10	2.35	0.87	3.18	0.77	2.59	20.86	0.66	21.51
35	9.20	1.87	0.42	0.18	0.10	2.35	0.87	3.36	0.82	2.74	21.90	0.69	22.60
40	9.79	2.02	0.45	0.18	0.11	2.35	0.87	3.56	0.86	2.90	23.08	0.74	23.82
45	10.47	2.20	0.47	0.18	0.11	2.35	0.87	3.78	0.92	3.09	24.43	0.78	25.21
50	11.27	2.40	0.49	0.18	0.11	2.35	0.87	4.04	0.98	3.29	25.99	0.84	26.82

Table VOC HCV 74
Financial Cost of Operation of Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.34	0.65	0.21	0.13	0.02	0.59	0.22	2.07	0.50	1.69	12.43	0.43	12.85
5	6.54	0.67	0.23	0.13	0.03	0.59	0.22	2.15	0.52	1.75	12.82	0.44	13.27
10	6.75	0.69	0.25	0.13	0.03	0.59	0.22	2.23	0.54	1.82	13.25	0.46	13.71
15	6.98	0.70	0.28	0.13	0.03	0.59	0.22	2.32	0.56	1.89	13.72	0.48	14.20
20	7.24	0.72	0.30	0.13	0.04	0.59	0.22	2.42	0.59	1.97	14.23	0.50	14.73
25	7.53	0.75	0.33	0.13	0.04	0.59	0.22	2.52	0.61	2.06	14.78	0.52	15.30
30	7.84	0.77	0.35	0.13	0.05	0.59	0.22	2.64	0.64	2.15	15.38	0.55	15.93
35	8.19	0.79	0.38	0.13	0.05	0.59	0.22	2.77	0.67	2.26	16.05	0.57	16.62
40	8.58	0.82	0.40	0.13	0.05	0.59	0.22	2.91	0.71	2.37	16.78	0.60	17.38
45	9.01	0.84	0.43	0.13	0.06	0.59	0.22	3.06	0.74	2.50	17.58	0.63	18.22
50	9.50	0.87	0.45	0.13	0.06	0.59	0.22	3.23	0.79	2.64	18.48	0.67	19.15

Table VOC HCV 75
Financial Cost of Operation of Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.35	0.66	0.21	0.14	0.03	0.68	0.25	2.10	0.51	1.71	12.64	0.43	13.08
5	6.55	0.68	0.23	0.14	0.03	0.68	0.25	2.18	0.53	1.78	13.05	0.45	13.50
10	6.77	0.70	0.26	0.14	0.04	0.68	0.25	2.26	0.55	1.85	13.50	0.47	13.96
15	7.02	0.72	0.28	0.14	0.04	0.68	0.25	2.36	0.57	1.92	13.98	0.49	14.47
20	7.28	0.74	0.31	0.14	0.04	0.68	0.25	2.46	0.60	2.01	14.50	0.51	15.01
25	7.58	0.76	0.33	0.14	0.05	0.68	0.25	2.57	0.62	2.10	15.08	0.53	15.61
30	7.91	0.78	0.35	0.14	0.05	0.68	0.25	2.69	0.65	2.19	15.70	0.56	16.26
35	8.27	0.81	0.38	0.14	0.06	0.68	0.25	2.82	0.69	2.30	16.39	0.58	16.97
40	8.68	0.83	0.40	0.14	0.06	0.68	0.25	2.97	0.72	2.42	17.15	0.61	17.76
45	9.13	0.86	0.43	0.14	0.06	0.68	0.25	3.13	0.76	2.55	17.99	0.65	18.64
50	9.65	0.89	0.45	0.14	0.07	0.68	0.25	3.31	0.80	2.70	18.94	0.68	19.62

Table VOC HCV 76
Financial Cost of Operation of Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.36	0.67	0.21	0.15	0.04	0.78	0.29	2.13	0.52	1.74	12.88	0.44	13.32
5	6.57	0.69	0.24	0.15	0.04	0.78	0.29	2.21	0.54	1.80	13.31	0.46	13.76
10	6.80	0.71	0.26	0.15	0.04	0.78	0.29	2.30	0.56	1.88	13.77	0.48	14.24
15	7.05	0.73	0.28	0.15	0.05	0.78	0.29	2.40	0.58	1.96	14.26	0.50	14.76
20	7.33	0.75	0.31	0.15	0.05	0.78	0.29	2.50	0.61	2.04	14.81	0.52	15.32
25	7.64	0.77	0.33	0.15	0.06	0.78	0.29	2.61	0.64	2.13	15.40	0.54	15.94
30	7.98	0.79	0.36	0.15	0.06	0.78	0.29	2.74	0.67	2.24	16.05	0.57	16.62
35	8.36	0.82	0.38	0.15	0.06	0.78	0.29	2.88	0.70	2.35	16.77	0.60	17.36
40	8.79	0.85	0.41	0.15	0.07	0.78	0.29	3.03	0.74	2.47	17.56	0.63	18.18
45	9.26	0.88	0.43	0.15	0.07	0.78	0.29	3.20	0.78	2.61	18.44	0.66	19.10
50	9.80	0.91	0.45	0.15	0.07	0.78	0.29	3.38	0.82	2.76	19.43	0.70	20.13

Table VOC HCV 77
Financial Cost of Operation of Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.38	0.68	0.21	0.15	0.04	0.90	0.33	2.16	0.53	1.76	13.15	0.45	13.60
5	6.59	0.70	0.24	0.15	0.05	0.90	0.33	2.25	0.55	1.83	13.59	0.46	14.05
10	6.83	0.72	0.26	0.15	0.05	0.90	0.33	2.34	0.57	1.91	14.06	0.48	14.55
15	7.09	0.74	0.29	0.15	0.05	0.90	0.33	2.44	0.59	1.99	14.58	0.50	15.08
20	7.38	0.76	0.31	0.15	0.06	0.90	0.33	2.54	0.62	2.08	15.14	0.53	15.67
25	7.71	0.78	0.34	0.15	0.06	0.90	0.33	2.66	0.65	2.17	15.76	0.55	16.31
30	8.06	0.81	0.36	0.15	0.07	0.90	0.33	2.79	0.68	2.28	16.43	0.58	17.01
35	8.46	0.83	0.38	0.15	0.07	0.90	0.33	2.93	0.71	2.39	17.18	0.61	17.78
40	8.90	0.86	0.41	0.15	0.07	0.90	0.33	3.09	0.75	2.52	18.00	0.64	18.64
45	9.40	0.89	0.43	0.15	0.08	0.90	0.33	3.27	0.79	2.67	18.92	0.68	19.60
50	9.97	0.93	0.46	0.15	0.08	0.90	0.33	3.46	0.84	2.83	19.96	0.72	20.68

Table VOC HCV 78
Financial Cost of Operation of Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.39	0.69	0.22	0.16	0.05	1.04	0.38	2.19	0.53	1.79	13.45	0.45	13.90
5	6.62	0.71	0.24	0.16	0.05	1.04	0.38	2.28	0.55	1.86	13.90	0.47	14.37
10	6.87	0.73	0.26	0.16	0.06	1.04	0.38	2.37	0.58	1.94	14.39	0.49	14.88
15	7.14	0.75	0.29	0.16	0.06	1.04	0.38	2.48	0.60	2.02	14.92	0.51	15.44
20	7.44	0.77	0.31	0.16	0.06	1.04	0.38	2.59	0.63	2.11	15.51	0.54	16.04
25	7.78	0.80	0.34	0.16	0.07	1.04	0.38	2.71	0.66	2.21	16.15	0.56	16.71
30	8.15	0.82	0.36	0.16	0.07	1.04	0.38	2.85	0.69	2.32	16.85	0.59	17.44
35	8.56	0.85	0.39	0.16	0.08	1.04	0.38	2.99	0.73	2.44	17.62	0.62	18.24
40	9.03	0.88	0.41	0.16	0.08	1.04	0.38	3.16	0.77	2.58	18.48	0.65	19.14
45	9.55	0.91	0.44	0.16	0.08	1.04	0.38	3.34	0.81	2.73	19.45	0.69	20.14
50	10.16	0.94	0.46	0.16	0.09	1.04	0.38	3.55	0.86	2.90	20.54	0.73	21.27

Table VOC HCV 79
Financial Cost of Operation of Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.41	0.70	0.22	0.16	0.06	1.20	0.44	2.23	0.54	1.82	13.78	0.46	14.24
5	6.65	0.72	0.24	0.16	0.06	1.20	0.44	2.32	0.56	1.89	14.25	0.48	14.73
10	6.91	0.74	0.27	0.16	0.06	1.20	0.44	2.41	0.59	1.97	14.75	0.50	15.25
15	7.19	0.76	0.29	0.16	0.07	1.20	0.44	2.52	0.61	2.06	15.31	0.52	15.83
20	7.50	0.79	0.32	0.16	0.07	1.20	0.44	2.64	0.64	2.15	15.91	0.55	16.46
25	7.85	0.81	0.34	0.16	0.08	1.20	0.44	2.76	0.67	2.26	16.57	0.57	17.15
30	8.24	0.84	0.36	0.16	0.08	1.20	0.44	2.90	0.71	2.37	17.30	0.60	17.90
35	8.67	0.87	0.39	0.16	0.08	1.20	0.44	3.06	0.74	2.50	18.11	0.63	18.74
40	9.16	0.90	0.41	0.16	0.09	1.20	0.44	3.23	0.78	2.64	19.01	0.67	19.68
45	9.72	0.93	0.44	0.16	0.09	1.20	0.44	3.42	0.83	2.79	20.02	0.71	20.73
50	10.35	0.96	0.46	0.16	0.09	1.20	0.44	3.64	0.88	2.97	21.17	0.75	21.92

Table VOC HCV 80
Financial Cost of Operation of Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.44	0.71	0.22	0.17	0.06	1.38	0.51	2.26	0.55	1.85	14.15	0.47	14.62
5	6.68	0.73	0.25	0.17	0.07	1.38	0.51	2.35	0.57	1.92	14.63	0.49	15.12
10	6.95	0.75	0.27	0.17	0.07	1.38	0.51	2.46	0.60	2.00	15.16	0.51	15.67
15	7.25	0.78	0.29	0.17	0.07	1.38	0.51	2.56	0.62	2.09	15.73	0.53	16.26
20	7.57	0.80	0.32	0.17	0.08	1.38	0.51	2.68	0.65	2.19	16.36	0.56	16.91
25	7.94	0.83	0.34	0.17	0.08	1.38	0.51	2.82	0.68	2.30	17.04	0.58	17.63
30	8.34	0.85	0.37	0.17	0.09	1.38	0.51	2.96	0.72	2.42	17.80	0.61	18.42
35	8.79	0.88	0.39	0.17	0.09	1.38	0.51	3.12	0.76	2.55	18.65	0.65	19.29
40	9.31	0.91	0.42	0.17	0.09	1.38	0.51	3.30	0.80	2.70	19.59	0.68	20.27
45	9.89	0.95	0.44	0.17	0.10	1.38	0.51	3.50	0.85	2.86	20.65	0.73	21.38
50	10.57	0.98	0.46	0.17	0.10	1.38	0.51	3.73	0.91	3.05	21.86	0.77	22.63

Table VOC HCV 81
Financial Cost of Operation of Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.47	0.72	0.22	0.18	0.07	1.59	0.59	2.30	0.56	1.88	14.56	0.48	15.04
5	6.72	0.74	0.25	0.18	0.07	1.59	0.59	2.39	0.58	1.95	15.06	0.50	15.56
10	7.00	0.76	0.27	0.18	0.08	1.59	0.59	2.50	0.61	2.04	15.61	0.52	16.12
15	7.31	0.79	0.30	0.18	0.08	1.59	0.59	2.61	0.63	2.13	16.20	0.54	16.74
20	7.65	0.81	0.32	0.18	0.08	1.59	0.59	2.74	0.66	2.23	16.85	0.57	17.42
25	8.02	0.84	0.35	0.18	0.09	1.59	0.59	2.87	0.70	2.34	17.56	0.59	18.16
30	8.45	0.87	0.37	0.18	0.09	1.59	0.59	3.02	0.73	2.47	18.36	0.63	18.98
35	8.92	0.90	0.39	0.18	0.10	1.59	0.59	3.19	0.78	2.61	19.24	0.66	19.90
40	9.46	0.93	0.42	0.18	0.10	1.59	0.59	3.38	0.82	2.76	20.22	0.70	20.92
45	10.08	0.97	0.44	0.18	0.10	1.59	0.59	3.59	0.87	2.93	21.34	0.74	22.08
50	10.80	1.01	0.47	0.18	0.11	1.59	0.59	3.83	0.93	3.13	22.62	0.79	23.41

Table VOC HCV 82
Financial Cost of Operation of Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.50	0.73	0.23	0.18	0.08	1.83	0.67	2.33	0.57	1.91	15.03	0.48	15.51
5	6.76	0.75	0.25	0.18	0.08	1.83	0.67	2.43	0.59	1.99	15.54	0.50	16.05
10	7.05	0.78	0.27	0.18	0.08	1.83	0.67	2.54	0.62	2.07	16.11	0.53	16.63
15	7.37	0.80	0.30	0.18	0.09	1.83	0.67	2.66	0.65	2.17	16.72	0.55	17.27
20	7.73	0.83	0.32	0.18	0.09	1.83	0.67	2.79	0.68	2.28	17.40	0.58	17.97
25	8.12	0.86	0.35	0.18	0.09	1.83	0.67	2.93	0.71	2.39	18.14	0.61	18.75
30	8.56	0.89	0.37	0.18	0.10	1.83	0.67	3.09	0.75	2.52	18.97	0.64	19.60
35	9.06	0.92	0.40	0.18	0.10	1.83	0.67	3.26	0.79	2.66	19.89	0.68	20.56
40	9.63	0.95	0.42	0.18	0.11	1.83	0.67	3.46	0.84	2.82	20.92	0.72	21.64
45	10.29	0.99	0.45	0.18	0.11	1.83	0.67	3.68	0.89	3.01	22.10	0.76	22.86
50	11.06	1.03	0.47	0.18	0.11	1.83	0.67	3.93	0.96	3.21	23.46	0.81	24.27

VOC Tables for Multi-Axle Heavy Commercial Vehicles

(Clause 6.9)

Table VOC MAV 1
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.36	1.66	0.25	0.07	0.01	0.51	0.19	3.13	0.60	2.62	14.39	1.04	15.42
5	6.42	1.75	0.26	0.07	0.01	0.51	0.19	3.24	0.62	2.71	15.78	1.07	16.85
10	7.50	1.86	0.28	0.07	0.01	0.51	0.19	3.35	0.65	2.80	17.21	1.11	18.32
15	8.58	1.98	0.30	0.07	0.02	0.51	0.19	3.47	0.67	2.91	18.69	1.15	19.84
20	9.68	2.12	0.31	0.07	0.02	0.51	0.19	3.61	0.70	3.02	20.21	1.19	21.41
25	10.80	2.27	0.33	0.07	0.02	0.51	0.19	3.75	0.72	3.14	21.80	1.24	23.04
30	11.93	2.45	0.35	0.07	0.02	0.51	0.19	3.91	0.75	3.27	23.44	1.29	24.73
35	13.08	2.67	0.36	0.07	0.02	0.51	0.19	4.07	0.79	3.41	25.17	1.35	26.51
40	14.25	2.92	0.38	0.07	0.02	0.51	0.19	4.26	0.82	3.56	26.98	1.41	28.39
45	15.45	3.23	0.39	0.07	0.03	0.51	0.19	4.46	0.86	3.73	28.91	1.48	30.39
50	16.68	3.60	0.41	0.07	0.03	0.51	0.19	4.68	0.90	3.92	30.98	1.55	32.53

Table VOC MAV 2
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.39	1.71	0.31	0.07	0.01	0.59	0.22	3.17	0.61	2.65	14.73	1.05	15.78
5	6.46	1.81	0.32	0.07	0.02	0.59	0.22	3.28	0.63	2.75	16.14	1.09	17.22
10	7.54	1.92	0.34	0.07	0.02	0.59	0.22	3.40	0.66	2.85	17.59	1.12	18.71
15	8.64	2.05	0.35	0.07	0.02	0.59	0.22	3.53	0.68	2.95	19.08	1.17	20.25
20	9.74	2.19	0.37	0.07	0.02	0.59	0.22	3.66	0.71	3.07	20.63	1.21	21.84
25	10.86	2.36	0.39	0.07	0.02	0.59	0.22	3.81	0.73	3.19	22.24	1.26	23.50
30	12.00	2.56	0.40	0.07	0.02	0.59	0.22	3.97	0.77	3.32	23.92	1.31	25.23
35	13.16	2.79	0.42	0.07	0.03	0.59	0.22	4.15	0.80	3.47	25.68	1.37	27.05
40	14.34	3.07	0.43	0.07	0.03	0.59	0.22	4.34	0.84	3.63	27.55	1.43	28.98
45	15.55	3.41	0.45	0.07	0.03	0.59	0.22	4.54	0.88	3.80	29.53	1.50	31.04
50	16.79	3.83	0.47	0.07	0.03	0.59	0.22	4.77	0.92	4.00	31.68	1.58	33.26

Table VOC MAV 3
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.43	1.76	0.36	0.07	0.02	0.67	0.25	3.21	0.62	2.69	15.09	1.06	16.15
5	6.51	1.86	0.38	0.07	0.02	0.67	0.25	3.33	0.64	2.78	16.52	1.10	17.62
10	7.59	1.98	0.40	0.07	0.02	0.67	0.25	3.45	0.67	2.89	17.99	1.14	19.13
15	8.69	2.12	0.41	0.07	0.02	0.67	0.25	3.58	0.69	3.00	19.50	1.18	20.69
20	9.80	2.28	0.43	0.07	0.02	0.67	0.25	3.72	0.72	3.11	21.08	1.23	22.31
25	10.93	2.46	0.44	0.07	0.03	0.67	0.25	3.87	0.75	3.24	22.72	1.28	24.00
30	12.08	2.67	0.46	0.07	0.03	0.67	0.25	4.04	0.78	3.38	24.43	1.34	25.77
35	13.24	2.92	0.48	0.07	0.03	0.67	0.25	4.22	0.81	3.53	26.23	1.40	27.63
40	14.44	3.23	0.49	0.07	0.03	0.67	0.25	4.42	0.85	3.70	28.15	1.46	29.61
45	15.66	3.61	0.51	0.07	0.03	0.67	0.25	4.63	0.89	3.88	30.21	1.53	31.74
50	16.91	4.09	0.52	0.07	0.03	0.67	0.25	4.87	0.94	4.08	32.45	1.61	34.06

Table VOC MAV 4
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.48	1.81	0.42	0.08	0.02	0.78	0.29	3.26	0.63	2.73	15.48	1.08	16.55
5	6.55	1.92	0.44	0.08	0.02	0.78	0.29	3.37	0.65	2.82	16.92	1.12	18.04
10	7.64	2.05	0.45	0.08	0.02	0.78	0.29	3.50	0.67	2.93	18.41	1.16	19.57
15	8.75	2.20	0.47	0.08	0.03	0.78	0.29	3.63	0.70	3.04	19.95	1.20	21.16
20	9.87	2.36	0.48	0.08	0.03	0.78	0.29	3.78	0.73	3.16	21.55	1.25	22.80
25	11.00	2.56	0.50	0.08	0.03	0.78	0.29	3.94	0.76	3.30	23.22	1.30	24.53
30	12.16	2.79	0.52	0.08	0.03	0.78	0.29	4.11	0.79	3.44	24.98	1.36	26.34
35	13.33	3.07	0.53	0.08	0.03	0.78	0.29	4.30	0.83	3.60	26.83	1.42	28.25
40	14.53	3.41	0.55	0.08	0.03	0.78	0.29	4.50	0.87	3.77	28.81	1.49	30.30
45	15.77	3.84	0.57	0.08	0.04	0.78	0.29	4.73	0.91	3.96	30.94	1.56	32.50
50	17.04	4.39	0.58	0.08	0.04	0.78	0.29	4.97	0.96	4.16	33.28	1.65	34.93

Table VOC MAV 5
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.52	1.86	0.48	0.08	0.02	0.89	0.33	3.30	0.64	2.76	15.89	1.09	16.99
5	6.60	1.98	0.49	0.08	0.03	0.89	0.33	3.42	0.66	2.87	17.36	1.13	18.49
10	7.70	2.12	0.51	0.08	0.03	0.89	0.33	3.55	0.68	2.97	18.87	1.18	20.04
15	8.81	2.28	0.53	0.08	0.03	0.89	0.33	3.69	0.71	3.09	20.43	1.22	21.66
20	9.93	2.46	0.54	0.08	0.03	0.89	0.33	3.84	0.74	3.22	22.06	1.27	23.34
25	11.07	2.67	0.56	0.08	0.03	0.89	0.33	4.00	0.77	3.35	23.77	1.32	25.09
30	12.24	2.93	0.57	0.08	0.03	0.89	0.33	4.18	0.81	3.50	25.57	1.38	26.95
35	13.42	3.24	0.59	0.08	0.04	0.89	0.33	4.37	0.84	3.66	27.47	1.45	28.92
40	14.64	3.62	0.61	0.08	0.04	0.89	0.33	4.59	0.88	3.84	29.51	1.52	31.03
45	15.88	4.10	0.62	0.08	0.04	0.89	0.33	4.82	0.93	4.04	31.74	1.60	33.33
50	17.17	4.73	0.64	0.08	0.04	0.89	0.33	5.08	0.98	4.25	34.20	1.68	35.88

Table VOC MAV 6
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.57	1.92	0.54	0.08	0.03	1.03	0.38	3.35	0.65	2.80	16.34	1.11	17.45
5	6.65	2.05	0.55	0.08	0.03	1.03	0.38	3.47	0.67	2.91	17.83	1.15	18.97
10	7.75	2.20	0.57	0.08	0.03	1.03	0.38	3.61	0.70	3.02	19.36	1.19	20.55
15	8.87	2.37	0.58	0.08	0.03	1.03	0.38	3.75	0.72	3.14	20.95	1.24	22.19
20	10.00	2.56	0.60	0.08	0.03	1.03	0.38	3.90	0.75	3.27	22.62	1.29	23.91
25	11.15	2.80	0.62	0.08	0.04	1.03	0.38	4.07	0.79	3.41	24.36	1.35	25.71
30	12.32	3.08	0.63	0.08	0.04	1.03	0.38	4.26	0.82	3.56	26.20	1.41	27.61
35	13.52	3.42	0.65	0.08	0.04	1.03	0.38	4.46	0.86	3.73	28.17	1.47	29.64
40	14.74	3.85	0.66	0.08	0.04	1.03	0.38	4.68	0.90	3.92	30.28	1.55	31.83
45	16.01	4.40	0.68	0.08	0.04	1.03	0.38	4.92	0.95	4.12	32.61	1.63	34.24
50	17.31	5.13	0.70	0.08	0.04	1.03	0.38	5.19	1.00	4.35	35.22	1.72	36.93

Table VOC MAV 7
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.61	1.99	0.59	0.08	0.03	1.19	0.44	3.40	0.66	2.84	16.83	1.12	17.95
5	6.71	2.12	0.61	0.08	0.03	1.19	0.44	3.52	0.68	2.95	18.33	1.17	19.50
10	7.81	2.28	0.62	0.08	0.03	1.19	0.44	3.66	0.71	3.06	19.89	1.21	21.10
15	8.93	2.46	0.64	0.08	0.03	1.19	0.44	3.81	0.73	3.19	21.51	1.26	22.77
20	10.07	2.68	0.66	0.08	0.04	1.19	0.44	3.97	0.77	3.32	23.21	1.31	24.52
25	11.23	2.93	0.67	0.08	0.04	1.19	0.44	4.14	0.80	3.47	25.00	1.37	26.37
30	12.41	3.24	0.69	0.08	0.04	1.19	0.44	4.33	0.84	3.63	26.89	1.43	28.32
35	13.62	3.62	0.71	0.08	0.04	1.19	0.44	4.54	0.88	3.80	28.92	1.50	30.42
40	14.86	4.11	0.72	0.08	0.04	1.19	0.44	4.77	0.92	4.00	31.13	1.58	32.71
45	16.14	4.74	0.74	0.08	0.05	1.19	0.44	5.03	0.97	4.21	33.57	1.66	35.24
50	17.46	5.61	0.75	0.08	0.05	1.19	0.44	5.31	1.02	4.44	36.35	1.76	38.11

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Table VOC MAV 8
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.66	2.05	0.65	0.09	0.03	1.37	0.50	3.45	0.66	2.89	17.35	1.14	18.49
5	6.76	2.20	0.67	0.09	0.03	1.37	0.50	3.58	0.69	3.00	18.88	1.18	20.07
10	7.87	2.37	0.68	0.09	0.04	1.37	0.50	3.72	0.72	3.11	20.47	1.23	21.70
15	9.00	2.57	0.70	0.09	0.04	1.37	0.50	3.87	0.75	3.24	22.12	1.28	23.40
20	10.15	2.80	0.71	0.09	0.04	1.37	0.50	4.04	0.78	3.38	23.86	1.34	25.19
25	11.31	3.08	0.73	0.09	0.04	1.37	0.50	4.22	0.81	3.53	25.69	1.40	27.08
30	12.51	3.43	0.75	0.09	0.04	1.37	0.50	4.41	0.85	3.70	27.64	1.46	29.10
35	13.72	3.85	0.76	0.09	0.05	1.37	0.50	4.63	0.89	3.88	29.75	1.53	31.28
40	14.98	4.41	0.78	0.09	0.05	1.37	0.50	4.87	0.94	4.08	32.05	1.61	33.67
45	16.27	5.14	0.80	0.09	0.05	1.37	0.50	5.14	0.99	4.30	34.64	1.70	36.34
50	17.62	6.18	0.81	0.09	0.05	1.37	0.50	5.43	1.05	4.55	37.64	1.80	39.44

Table VOC MAV 9
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.71	2.13	0.71	0.09	0.04	1.57	0.58	3.50	0.67	2.93	17.93	1.16	19.08
5	6.82	2.28	0.72	0.09	0.04	1.57	0.58	3.63	0.70	3.04	19.48	1.20	20.68
10	7.94	2.47	0.74	0.09	0.04	1.57	0.58	3.78	0.73	3.16	21.09	1.25	22.34
15	9.07	2.68	0.76	0.09	0.04	1.57	0.58	3.94	0.76	3.29	22.78	1.30	24.08
20	10.23	2.94	0.77	0.09	0.04	1.57	0.58	4.11	0.79	3.44	24.56	1.36	25.92
25	11.40	3.25	0.79	0.09	0.04	1.57	0.58	4.29	0.83	3.59	26.44	1.42	27.86
30	12.60	3.63	0.80	0.09	0.05	1.57	0.58	4.50	0.87	3.77	28.46	1.49	29.95
35	13.84	4.12	0.82	0.09	0.05	1.57	0.58	4.72	0.91	3.95	30.65	1.56	32.22
40	15.10	4.75	0.84	0.09	0.05	1.57	0.58	4.97	0.96	4.16	33.08	1.65	34.73
45	16.42	5.62	0.85	0.09	0.05	1.57	0.58	5.25	1.01	4.39	35.84	1.74	37.58
50	17.79	6.88	0.87	0.09	0.05	1.57	0.58	5.56	1.07	4.65	39.12	1.84	40.96

Table VOC MAV 10
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 11000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.77	2.20	0.76	0.09	0.04	1.81	0.67	3.55	0.68	2.97	18.55	1.17	19.73
5	6.88	2.37	0.78	0.09	0.04	1.81	0.67	3.69	0.71	3.09	20.13	1.22	21.35
10	8.00	2.57	0.80	0.09	0.04	1.81	0.67	3.84	0.74	3.21	21.78	1.27	23.05
15	9.14	2.80	0.81	0.09	0.04	1.81	0.67	4.00	0.77	3.35	23.50	1.32	24.83
20	10.31	3.09	0.83	0.09	0.05	1.81	0.67	4.18	0.81	3.50	25.33	1.38	26.71
25	11.49	3.43	0.85	0.09	0.05	1.81	0.67	4.37	0.84	3.66	27.27	1.45	28.71
30	12.71	3.86	0.86	0.09	0.05	1.81	0.67	4.59	0.88	3.84	29.36	1.52	30.88
35	13.95	4.42	0.88	0.09	0.05	1.81	0.67	4.82	0.93	4.03	31.65	1.60	33.25
40	15.24	5.16	0.89	0.09	0.05	1.81	0.67	5.08	0.98	4.25	34.23	1.68	35.91
45	16.57	6.19	0.91	0.09	0.05	1.81	0.67	5.37	1.04	4.49	37.21	1.78	38.98
50	17.98	7.76	0.93	0.09	0.06	1.81	0.67	5.69	1.10	4.77	40.85	1.88	42.73

Table VOC MAV 11
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 12000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.82	2.29	0.82	0.10	0.04	2.08	0.77	3.60	0.70	3.02	19.24	1.19	20.43
5	6.94	2.47	0.84	0.10	0.04	2.08	0.77	3.75	0.72	3.14	20.85	1.24	22.09
10	8.07	2.68	0.85	0.10	0.05	2.08	0.77	3.90	0.75	3.27	22.53	1.29	23.82
15	9.22	2.94	0.87	0.10	0.05	2.08	0.77	4.07	0.79	3.41	24.30	1.35	25.64
20	10.39	3.25	0.89	0.10	0.05	2.08	0.77	4.25	0.82	3.56	26.17	1.41	27.58
25	11.59	3.64	0.90	0.10	0.05	2.08	0.77	4.46	0.86	3.73	28.17	1.47	29.65
30	12.81	4.12	0.92	0.10	0.05	2.08	0.77	4.68	0.90	3.91	30.35	1.55	31.90
35	14.07	4.76	0.94	0.10	0.05	2.08	0.77	4.92	0.95	4.12	32.77	1.63	34.39
40	15.38	5.64	0.95	0.10	0.06	2.08	0.77	5.19	1.00	4.35	35.51	1.72	37.23
45	16.74	6.90	0.97	0.10	0.06	2.08	0.77	5.49	1.06	4.60	38.77	1.82	40.59
50	18.18	8.90	0.98	0.10	0.06	2.08	0.77	5.83	1.12	4.88	42.91	1.93	44.84

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Table VOC MAV 12
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 13000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.88	2.38	0.88	0.10	0.05	2.40	1.58	3.66	0.71	3.06	20.69	1.21	21.91
5	7.00	2.57	0.90	0.10	0.05	2.40	1.58	3.81	0.73	3.19	22.33	1.26	23.59
10	8.14	2.81	0.91	0.10	0.05	2.40	1.58	3.97	0.77	3.32	24.05	1.31	25.36
15	9.30	3.09	0.93	0.10	0.05	2.40	1.58	4.14	0.80	3.47	25.86	1.37	27.23
20	10.48	3.44	0.94	0.10	0.05	2.40	1.58	4.33	0.84	3.63	27.79	1.43	29.23
25	11.69	3.87	0.96	0.10	0.05	2.40	1.58	4.54	0.88	3.80	29.87	1.50	31.37
30	12.93	4.43	0.98	0.10	0.06	2.40	1.58	4.77	0.92	3.99	32.15	1.58	33.73
35	14.20	5.17	0.99	0.10	0.06	2.40	1.58	5.02	0.97	4.21	34.71	1.66	36.37
40	15.53	6.21	1.01	0.10	0.06	2.40	1.58	5.31	1.02	4.44	37.67	1.76	39.42
45	16.92	7.79	1.02	0.10	0.06	2.40	1.58	5.62	1.08	4.71	41.29	1.86	43.15
50	18.39	10.43	1.04	0.10	0.06	2.40	1.58	5.98	1.15	5.01	46.14	1.98	48.12

Table VOC MAV 13
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 14000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.94	2.47	0.94	0.10	0.05	2.76	1.82	3.72	0.72	3.11	21.64	1.23	22.87
5	7.07	2.69	0.95	0.10	0.05	2.76	1.82	3.87	0.75	3.24	23.31	1.28	24.59
10	8.22	2.95	0.97	0.10	0.05	2.76	1.82	4.04	0.78	3.38	25.06	1.34	26.40
15	9.38	3.26	0.99	0.10	0.05	2.76	1.82	4.22	0.81	3.53	26.93	1.40	28.32
20	10.57	3.64	1.00	0.10	0.06	2.76	1.82	4.41	0.85	3.69	28.92	1.46	30.38
25	11.79	4.13	1.02	0.10	0.06	2.76	1.82	4.63	0.89	3.88	31.09	1.53	32.62
30	13.05	4.77	1.03	0.10	0.06	2.76	1.82	4.87	0.94	4.08	33.49	1.61	35.10
35	14.34	5.65	1.05	0.10	0.06	2.76	1.82	5.13	0.99	4.30	36.21	1.70	37.91
40	15.69	6.92	1.07	0.10	0.06	2.76	1.82	5.43	1.05	4.54	39.45	1.80	41.25
45	17.11	8.93	1.08	0.10	0.06	2.76	1.82	5.76	1.11	4.82	43.57	1.91	45.48
50	18.62	12.59	1.10	0.10	0.07	2.76	1.82	6.14	1.18	5.14	49.52	2.03	51.55

Table VOC MAV 14
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 15000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	6.01	2.58	0.99	0.11	0.05	3.18	2.10	3.78	0.73	3.16	22.68	1.25	23.93
5	7.14	2.81	1.01	0.11	0.05	3.18	2.10	3.93	0.76	3.29	24.39	1.30	25.69
10	8.30	3.10	1.03	0.11	0.05	3.18	2.10	4.11	0.79	3.44	26.19	1.36	27.55
15	9.47	3.44	1.04	0.11	0.06	3.18	2.10	4.29	0.83	3.59	28.11	1.42	29.53
20	10.67	3.88	1.06	0.11	0.06	3.18	2.10	4.50	0.87	3.76	30.18	1.49	31.67
25	11.90	4.44	1.08	0.11	0.06	3.18	2.10	4.72	0.91	3.95	32.45	1.56	34.01
30	13.17	5.18	1.09	0.11	0.06	3.18	2.10	4.97	0.96	4.16	34.98	1.65	36.63
35	14.49	6.23	1.11	0.11	0.06	3.18	2.10	5.25	1.01	4.39	37.93	1.74	39.67
40	15.86	7.82	1.12	0.11	0.07	3.18	2.10	5.56	1.07	4.65	41.53	1.84	43.37
45	17.32	10.48	1.14	0.11	0.07	3.18	2.10	5.90	1.14	4.94	46.37	1.95	48.33
50	18.88	15.90	1.16	0.11	0.07	3.18	2.10	6.30	1.21	5.27	54.17	2.08	56.25

Table VOC MAV 15
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.52	1.39	0.21	0.07	0.01	0.38	0.25	2.92	0.56	2.44	13.75	0.97	14.72
5	6.56	1.46	0.23	0.07	0.01	0.38	0.25	3.02	0.58	2.53	15.08	1.00	16.08
10	7.60	1.53	0.24	0.07	0.01	0.38	0.25	3.13	0.60	2.62	16.44	1.04	17.47
15	8.66	1.61	0.26	0.07	0.02	0.38	0.25	3.25	0.63	2.72	17.84	1.07	18.91
20	9.74	1.70	0.28	0.07	0.02	0.38	0.25	3.38	0.65	2.83	19.28	1.12	20.39
25	10.82	1.80	0.29	0.07	0.02	0.38	0.25	3.51	0.68	2.94	20.76	1.16	21.92
30	11.93	1.91	0.31	0.07	0.02	0.38	0.25	3.66	0.71	3.07	22.30	1.21	23.51
35	13.05	2.04	0.32	0.07	0.02	0.38	0.25	3.83	0.74	3.20	23.90	1.27	25.16
40	14.19	2.18	0.34	0.07	0.02	0.38	0.25	4.01	0.77	3.35	25.57	1.33	26.89
45	15.36	2.35	0.36	0.07	0.03	0.38	0.25	4.20	0.81	3.52	27.32	1.39	28.71
50	16.56	2.54	0.37	0.07	0.03	0.38	0.25	4.42	0.85	3.70	29.17	1.46	30.63

Table VOC MAV 16
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.55	1.43	0.25	0.07	0.01	0.44	0.29	2.96	0.57	2.47	14.03	0.98	15.01
5	6.59	1.49	0.27	0.07	0.02	0.44	0.29	3.06	0.59	2.56	15.37	1.01	16.39
10	7.64	1.57	0.28	0.07	0.02	0.44	0.29	3.17	0.61	2.66	16.75	1.05	17.80
15	8.70	1.66	0.30	0.07	0.02	0.44	0.29	3.30	0.64	2.76	18.16	1.09	19.25
20	9.78	1.75	0.32	0.07	0.02	0.44	0.29	3.43	0.66	2.87	19.62	1.13	20.75
25	10.88	1.85	0.33	0.07	0.02	0.44	0.29	3.57	0.69	2.99	21.13	1.18	22.31
30	11.99	1.97	0.35	0.07	0.02	0.44	0.29	3.73	0.72	3.12	22.69	1.23	23.92
35	13.12	2.11	0.36	0.07	0.03	0.44	0.29	3.90	0.75	3.26	24.32	1.29	25.61
40	14.27	2.26	0.38	0.07	0.03	0.44	0.29	4.08	0.79	3.42	26.02	1.35	27.37
45	15.45	2.44	0.40	0.07	0.03	0.44	0.29	4.28	0.83	3.59	27.81	1.42	29.23
50	16.66	2.66	0.41	0.07	0.03	0.44	0.29	4.51	0.87	3.78	29.71	1.49	31.20

Table VOC MAV 17
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.58	1.46	0.29	0.07	0.02	0.50	0.33	3.00	0.58	2.51	14.33	0.99	15.33
5	6.62	1.53	0.31	0.07	0.02	0.50	0.33	3.11	0.60	2.60	15.69	1.03	16.72
10	7.68	1.61	0.32	0.07	0.02	0.50	0.33	3.22	0.62	2.70	17.08	1.07	18.14
15	8.75	1.70	0.34	0.07	0.02	0.50	0.33	3.35	0.65	2.80	18.51	1.11	19.62
20	9.83	1.80	0.35	0.07	0.02	0.50	0.33	3.48	0.67	2.92	19.99	1.15	21.14
25	10.93	1.91	0.37	0.07	0.03	0.50	0.33	3.63	0.70	3.04	21.52	1.20	22.72
30	12.05	2.04	0.39	0.07	0.03	0.50	0.33	3.79	0.73	3.17	23.11	1.25	24.36
35	13.19	2.19	0.40	0.07	0.03	0.50	0.33	3.97	0.77	3.32	24.76	1.31	26.08
40	14.35	2.35	0.42	0.07	0.03	0.50	0.33	4.16	0.80	3.48	26.50	1.38	27.88
45	15.54	2.55	0.44	0.07	0.03	0.50	0.33	4.37	0.84	3.66	28.34	1.45	29.78
50	16.77	2.78	0.45	0.07	0.03	0.50	0.33	4.61	0.89	3.86	30.28	1.52	31.81

Table VOC MAV 18
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.61	1.50	0.33	0.08	0.02	0.58	0.38	3.04	0.59	2.54	14.66	1.01	15.66
5	6.66	1.57	0.35	0.08	0.02	0.58	0.38	3.15	0.61	2.64	16.03	1.04	17.07
10	7.72	1.66	0.36	0.08	0.02	0.58	0.38	3.27	0.63	2.74	17.43	1.08	18.51
15	8.79	1.75	0.38	0.08	0.03	0.58	0.38	3.40	0.66	2.85	18.88	1.13	20.01
20	9.88	1.86	0.39	0.08	0.03	0.58	0.38	3.54	0.68	2.96	20.38	1.17	21.55
25	10.99	1.98	0.41	0.08	0.03	0.58	0.38	3.69	0.71	3.09	21.94	1.22	23.16
30	12.12	2.11	0.43	0.08	0.03	0.58	0.38	3.86	0.74	3.23	23.55	1.28	24.83
35	13.27	2.27	0.44	0.08	0.03	0.58	0.38	4.04	0.78	3.38	25.24	1.34	26.58
40	14.44	2.45	0.46	0.08	0.03	0.58	0.38	4.24	0.82	3.55	27.02	1.40	28.42
45	15.64	2.66	0.47	0.08	0.04	0.58	0.38	4.46	0.86	3.73	28.90	1.48	30.37
50	16.88	2.91	0.49	0.08	0.04	0.58	0.38	4.71	0.91	3.94	30.90	1.56	32.46

Table VOC MAV 19
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.64	1.53	0.37	0.08	0.02	0.66	0.44	3.08	0.59	2.58	15.00	1.02	16.02
5	6.70	1.61	0.38	0.08	0.03	0.66	0.44	3.20	0.62	2.68	16.39	1.06	17.45
10	7.76	1.70	0.40	0.08	0.03	0.66	0.44	3.32	0.64	2.78	17.81	1.10	18.91
15	8.84	1.80	0.42	0.08	0.03	0.66	0.44	3.45	0.67	2.89	19.28	1.14	20.43
20	9.94	1.92	0.43	0.08	0.03	0.66	0.44	3.60	0.69	3.01	20.80	1.19	22.00
25	11.05	2.04	0.45	0.08	0.03	0.66	0.44	3.76	0.72	3.14	22.38	1.24	23.63
30	12.19	2.19	0.47	0.08	0.03	0.66	0.44	3.93	0.76	3.29	24.03	1.30	25.33
35	13.35	2.35	0.48	0.08	0.04	0.66	0.44	4.12	0.79	3.45	25.76	1.36	27.12
40	14.53	2.55	0.50	0.08	0.04	0.66	0.44	4.32	0.83	3.62	27.57	1.43	29.01
45	15.75	2.78	0.51	0.08	0.04	0.66	0.44	4.55	0.88	3.81	29.50	1.51	31.01
50	17.00	3.06	0.53	0.08	0.04	0.66	0.44	4.81	0.93	4.03	31.57	1.59	33.16

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Table VOC MAV 20
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.68	1.57	0.41	0.08	0.03	0.77	0.50	3.13	0.60	2.62	15.38	1.03	16.41
5	6.73	1.66	0.42	0.08	0.03	0.77	0.50	3.24	0.63	2.72	16.78	1.07	17.85
10	7.81	1.75	0.44	0.08	0.03	0.77	0.50	3.37	0.65	2.82	18.22	1.12	19.34
15	8.89	1.86	0.46	0.08	0.03	0.77	0.50	3.51	0.68	2.94	19.72	1.16	20.88
20	10.00	1.98	0.47	0.08	0.03	0.77	0.50	3.66	0.71	3.06	21.26	1.21	22.47
25	11.12	2.11	0.49	0.08	0.04	0.77	0.50	3.82	0.74	3.20	22.87	1.26	24.13
30	12.26	2.27	0.50	0.08	0.04	0.77	0.50	4.00	0.77	3.35	24.55	1.32	25.87
35	13.43	2.45	0.52	0.08	0.04	0.77	0.50	4.20	0.81	3.51	26.31	1.39	27.70
40	14.63	2.66	0.54	0.08	0.04	0.77	0.50	4.41	0.85	3.69	28.17	1.46	29.63
45	15.86	2.91	0.55	0.08	0.04	0.77	0.50	4.65	0.90	3.89	30.16	1.54	31.70
50	17.13	3.22	0.57	0.08	0.04	0.77	0.50	4.92	0.95	4.12	32.29	1.63	33.92

Table VOC MAV 21
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.71	1.61	0.45	0.08	0.03	0.88	0.58	3.17	0.61	2.65	15.79	1.05	16.84
5	6.78	1.70	0.46	0.08	0.03	0.88	0.58	3.29	0.64	2.76	17.21	1.09	18.30
10	7.85	1.80	0.48	0.08	0.03	0.88	0.58	3.42	0.66	2.87	18.67	1.13	19.80
15	8.95	1.92	0.49	0.08	0.03	0.88	0.58	3.57	0.69	2.99	20.18	1.18	21.36
20	10.06	2.04	0.51	0.08	0.04	0.88	0.58	3.72	0.72	3.12	21.75	1.23	22.98
25	11.19	2.19	0.53	0.08	0.04	0.88	0.58	3.89	0.75	3.26	23.39	1.29	24.68
30	12.34	2.36	0.54	0.08	0.04	0.88	0.58	4.08	0.79	3.41	25.10	1.35	26.45
35	13.52	2.55	0.56	0.08	0.04	0.88	0.58	4.28	0.83	3.58	26.91	1.42	28.32
40	14.73	2.78	0.58	0.08	0.04	0.88	0.58	4.50	0.87	3.77	28.82	1.49	30.31
45	15.97	3.06	0.59	0.08	0.05	0.88	0.58	4.75	0.92	3.98	30.87	1.57	32.44
50	17.26	3.40	0.61	0.08	0.05	0.88	0.58	5.03	0.97	4.21	33.08	1.67	34.74

Table VOC MAV 22
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.75	1.66	0.49	0.09	0.03	1.02	0.67	3.22	0.62	2.69	16.23	1.07	17.30
5	6.82	1.75	0.50	0.09	0.03	1.02	0.67	3.34	0.64	2.80	17.67	1.11	18.78
10	7.90	1.86	0.52	0.09	0.04	1.02	0.67	3.48	0.67	2.91	19.15	1.15	20.30
15	9.00	1.98	0.53	0.09	0.04	1.02	0.67	3.63	0.70	3.04	20.69	1.20	21.89
20	10.12	2.12	0.55	0.09	0.04	1.02	0.67	3.79	0.73	3.17	22.29	1.25	23.54
25	11.26	2.27	0.57	0.09	0.04	1.02	0.67	3.96	0.76	3.32	23.95	1.31	25.26
30	12.42	2.45	0.58	0.09	0.04	1.02	0.67	4.15	0.80	3.48	25.70	1.37	27.08
35	13.61	2.67	0.60	0.09	0.05	1.02	0.67	4.36	0.84	3.65	27.55	1.44	29.00
40	14.83	2.92	0.61	0.09	0.05	1.02	0.67	4.60	0.89	3.85	29.52	1.52	31.04
45	16.10	3.22	0.63	0.09	0.05	1.02	0.67	4.86	0.94	4.07	31.63	1.61	33.24
50	17.41	3.60	0.65	0.09	0.05	1.02	0.67	5.15	0.99	4.31	33.94	1.70	35.64

Table VOC MAV 23
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.79	1.71	0.52	0.09	0.04	1.17	0.77	3.27	0.63	2.73	16.72	1.08	17.80
5	6.87	1.81	0.54	0.09	0.04	1.17	0.77	3.40	0.65	2.84	18.17	1.12	19.30
10	7.96	1.92	0.56	0.09	0.04	1.17	0.77	3.54	0.68	2.96	19.68	1.17	20.85
15	9.06	2.05	0.57	0.09	0.04	1.17	0.77	3.69	0.71	3.09	21.24	1.22	22.46
20	10.19	2.19	0.59	0.09	0.04	1.17	0.77	3.85	0.74	3.23	22.87	1.28	24.14
25	11.34	2.36	0.61	0.09	0.04	1.17	0.77	4.04	0.78	3.38	24.57	1.34	25.90
30	12.51	2.56	0.62	0.09	0.05	1.17	0.77	4.23	0.82	3.54	26.36	1.40	27.76
35	13.71	2.79	0.64	0.09	0.05	1.17	0.77	4.45	0.86	3.73	28.25	1.47	29.73
40	14.95	3.07	0.65	0.09	0.05	1.17	0.77	4.70	0.91	3.93	30.28	1.55	31.84
45	16.23	3.41	0.67	0.09	0.05	1.17	0.77	4.97	0.96	4.16	32.47	1.64	34.12
50	17.56	3.83	0.69	0.09	0.05	1.17	0.77	5.28	1.02	4.42	34.87	1.75	36.62

Table VOC MAV 24
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.68	1.22	0.19	0.07	0.01	0.33	0.22	2.78	0.54	2.32	13.36	0.92	14.28
5	6.69	1.27	0.21	0.07	0.01	0.33	0.22	2.88	0.55	2.41	14.64	0.95	15.59
10	7.71	1.33	0.23	0.07	0.01	0.33	0.22	2.98	0.58	2.50	15.95	0.99	16.94
15	8.75	1.39	0.24	0.07	0.02	0.33	0.22	3.10	0.60	2.59	17.30	1.02	18.32
20	9.80	1.45	0.26	0.07	0.02	0.33	0.22	3.22	0.62	2.70	18.68	1.07	19.75
25	10.87	1.53	0.28	0.07	0.02	0.33	0.22	3.35	0.65	2.81	20.11	1.11	21.22
30	11.95	1.61	0.29	0.07	0.02	0.33	0.22	3.50	0.68	2.93	21.59	1.16	22.75
35	13.05	1.70	0.31	0.07	0.02	0.33	0.22	3.66	0.71	3.06	23.12	1.21	24.33
40	14.17	1.79	0.32	0.07	0.02	0.33	0.22	3.83	0.74	3.21	24.71	1.27	25.98
45	15.32	1.91	0.34	0.07	0.03	0.33	0.22	4.02	0.78	3.37	26.38	1.33	27.71
50	16.50	2.03	0.36	0.07	0.03	0.33	0.22	4.24	0.82	3.55	28.12	1.40	29.52

Table VOC MAV 25
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.70	1.25	0.23	0.07	0.01	0.38	0.25	2.82	0.54	2.36	13.60	0.93	14.53
5	6.71	1.30	0.24	0.07	0.02	0.38	0.25	2.92	0.56	2.44	14.89	0.97	15.86
10	7.74	1.36	0.26	0.07	0.02	0.38	0.25	3.03	0.58	2.53	16.22	1.00	17.22
15	8.78	1.42	0.27	0.07	0.02	0.38	0.25	3.14	0.61	2.63	17.58	1.04	18.62
20	9.84	1.49	0.29	0.07	0.02	0.38	0.25	3.27	0.63	2.74	18.98	1.08	20.07
25	10.91	1.57	0.31	0.07	0.02	0.38	0.25	3.41	0.66	2.85	20.43	1.13	21.56
30	12.00	1.65	0.32	0.07	0.02	0.38	0.25	3.56	0.69	2.98	21.93	1.18	23.11
35	13.11	1.74	0.34	0.07	0.03	0.38	0.25	3.73	0.72	3.12	23.48	1.23	24.72
40	14.24	1.85	0.35	0.07	0.03	0.38	0.25	3.91	0.75	3.27	25.10	1.29	26.40
45	15.40	1.97	0.37	0.07	0.03	0.38	0.25	4.11	0.79	3.44	26.80	1.36	28.16
50	16.59	2.10	0.39	0.07	0.03	0.38	0.25	4.33	0.83	3.62	28.59	1.43	30.02

Table VOC MAV 26
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.72	1.27	0.26	0.07	0.02	0.44	0.29	2.85	0.55	2.39	13.86	0.94	14.80
5	6.74	1.33	0.27	0.07	0.02	0.44	0.29	2.96	0.57	2.48	15.16	0.98	16.14
10	7.77	1.39	0.29	0.07	0.02	0.44	0.29	3.07	0.59	2.57	16.50	1.02	17.52
15	8.82	1.46	0.30	0.07	0.02	0.44	0.29	3.19	0.62	2.67	17.88	1.06	18.94
20	9.88	1.53	0.32	0.07	0.02	0.44	0.29	3.33	0.64	2.78	19.30	1.10	20.40
25	10.96	1.61	0.34	0.07	0.03	0.44	0.29	3.47	0.67	2.90	20.77	1.15	21.92
30	12.06	1.70	0.35	0.07	0.03	0.44	0.29	3.62	0.70	3.03	22.29	1.20	23.49
35	13.18	1.80	0.37	0.07	0.03	0.44	0.29	3.80	0.73	3.18	23.87	1.26	25.13
40	14.32	1.91	0.39	0.07	0.03	0.44	0.29	3.98	0.77	3.33	25.52	1.32	26.84
45	15.49	2.03	0.40	0.07	0.03	0.44	0.29	4.19	0.81	3.51	27.26	1.39	28.64
50	16.69	2.18	0.42	0.07	0.03	0.44	0.29	4.42	0.85	3.70	29.08	1.46	30.55

Table VOC MAV 27
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.74	1.30	0.29	0.08	0.02	0.50	0.33	2.89	0.56	2.42	14.13	0.96	15.09
5	6.76	1.36	0.30	0.08	0.02	0.50	0.33	3.00	0.58	2.51	15.45	0.99	16.45
10	7.80	1.42	0.32	0.08	0.02	0.50	0.33	3.12	0.60	2.61	16.81	1.03	17.84
15	8.86	1.49	0.34	0.08	0.03	0.50	0.33	3.24	0.63	2.72	18.21	1.07	19.28
20	9.92	1.57	0.35	0.08	0.03	0.50	0.33	3.38	0.65	2.83	19.65	1.12	20.76
25	11.01	1.65	0.37	0.08	0.03	0.50	0.33	3.53	0.68	2.95	21.13	1.17	22.30
30	12.12	1.75	0.38	0.08	0.03	0.50	0.33	3.69	0.71	3.09	22.68	1.22	23.90
35	13.24	1.85	0.40	0.08	0.03	0.50	0.33	3.87	0.75	3.24	24.29	1.28	25.57
40	14.39	1.97	0.42	0.08	0.03	0.50	0.33	4.06	0.78	3.40	25.97	1.34	27.32
45	15.57	2.10	0.43	0.08	0.04	0.50	0.33	4.28	0.82	3.58	27.74	1.42	29.16
50	16.79	2.26	0.45	0.08	0.04	0.50	0.33	4.52	0.87	3.78	29.62	1.49	31.11

Table VOC MAV 28
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.76	1.33	0.32	0.08	0.02	0.58	0.38	2.94	0.57	2.46	14.43	0.97	15.41
5	6.79	1.39	0.33	0.08	0.03	0.58	0.38	3.05	0.59	2.55	15.77	1.01	16.78
10	7.84	1.46	0.35	0.08	0.03	0.58	0.38	3.17	0.61	2.65	17.14	1.05	18.19
15	8.90	1.53	0.37	0.08	0.03	0.58	0.38	3.30	0.64	2.76	18.55	1.09	19.64
20	9.97	1.61	0.38	0.08	0.03	0.58	0.38	3.44	0.66	2.88	20.01	1.14	21.15
25	11.06	1.70	0.40	0.08	0.03	0.58	0.38	3.59	0.69	3.01	21.52	1.19	22.71
30	12.18	1.80	0.41	0.08	0.03	0.58	0.38	3.76	0.72	3.15	23.09	1.24	24.34
35	13.31	1.91	0.43	0.08	0.04	0.58	0.38	3.94	0.76	3.30	24.73	1.30	26.04
40	14.48	2.04	0.45	0.08	0.04	0.58	0.38	4.14	0.80	3.47	26.45	1.37	27.82
45	15.67	2.18	0.46	0.08	0.04	0.58	0.38	4.37	0.84	3.66	28.26	1.45	29.71
50	16.90	2.35	0.48	0.08	0.04	0.58	0.38	4.62	0.89	3.87	30.19	1.53	31.71

Table VOC MAV 29
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.79	1.36	0.35	0.08	0.03	0.67	0.44	2.98	0.57	2.49	14.76	0.99	15.75
5	6.82	1.42	0.36	0.08	0.03	0.67	0.44	3.09	0.60	2.59	16.11	1.02	17.13
10	7.87	1.49	0.38	0.08	0.03	0.67	0.44	3.22	0.62	2.69	17.50	1.06	18.56
15	8.94	1.57	0.40	0.08	0.03	0.67	0.44	3.35	0.65	2.81	18.93	1.11	20.04
20	10.02	1.65	0.41	0.08	0.03	0.67	0.44	3.50	0.67	2.93	20.41	1.16	21.57
25	11.12	1.75	0.43	0.08	0.04	0.67	0.44	3.66	0.70	3.06	21.94	1.21	23.15
30	12.24	1.85	0.45	0.08	0.04	0.67	0.44	3.83	0.74	3.20	23.54	1.27	24.81
35	13.39	1.97	0.46	0.08	0.04	0.67	0.44	4.02	0.78	3.36	25.21	1.33	26.54
40	14.56	2.11	0.48	0.08	0.04	0.67	0.44	4.23	0.82	3.54	26.97	1.40	28.37
45	15.77	2.26	0.49	0.08	0.04	0.67	0.44	4.46	0.86	3.74	28.82	1.48	30.30
50	17.02	2.44	0.51	0.08	0.04	0.67	0.44	4.73	0.91	3.96	30.80	1.56	32.36

Table VOC MAV 30
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.81	1.39	0.38	0.08	0.03	0.77	0.51	3.02	0.58	2.53	15.11	1.00	16.11
5	6.85	1.46	0.40	0.08	0.03	0.77	0.51	3.14	0.61	2.63	16.48	1.04	17.52
10	7.91	1.53	0.41	0.08	0.03	0.77	0.51	3.27	0.63	2.74	17.88	1.08	18.97
15	8.98	1.61	0.43	0.08	0.03	0.77	0.51	3.41	0.66	2.85	19.33	1.13	20.46
20	10.07	1.70	0.44	0.08	0.04	0.77	0.51	3.56	0.69	2.98	20.84	1.18	22.01
25	11.18	1.80	0.46	0.08	0.04	0.77	0.51	3.72	0.72	3.12	22.40	1.23	23.63
30	12.31	1.91	0.48	0.08	0.04	0.77	0.51	3.90	0.75	3.27	24.02	1.29	25.31
35	13.47	2.04	0.49	0.08	0.04	0.77	0.51	4.10	0.79	3.43	25.73	1.36	27.08
40	14.66	2.18	0.51	0.08	0.04	0.77	0.51	4.32	0.83	3.62	27.52	1.43	28.95
45	15.88	2.35	0.52	0.08	0.05	0.77	0.51	4.56	0.88	3.82	29.42	1.51	30.93
50	17.14	2.54	0.54	0.08	0.05	0.77	0.51	4.84	0.93	4.05	31.46	1.60	33.06

Table VOC MAV 31
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.84	1.42	0.41	0.09	0.03	0.89	0.58	3.07	0.59	2.57	15.50	1.02	16.51
5	6.89	1.49	0.43	0.09	0.03	0.89	0.58	3.19	0.62	2.67	16.88	1.06	17.93
10	7.95	1.57	0.44	0.09	0.04	0.89	0.58	3.32	0.64	2.78	18.30	1.10	19.40
15	9.03	1.65	0.46	0.09	0.04	0.89	0.58	3.47	0.67	2.90	19.77	1.15	20.92
20	10.13	1.75	0.47	0.09	0.04	0.89	0.58	3.62	0.70	3.03	21.30	1.20	22.50
25	11.25	1.85	0.49	0.09	0.04	0.89	0.58	3.79	0.73	3.17	22.89	1.25	24.14
30	12.39	1.97	0.51	0.09	0.04	0.89	0.58	3.98	0.77	3.33	24.54	1.32	25.86
35	13.55	2.11	0.52	0.09	0.05	0.89	0.58	4.18	0.81	3.50	26.28	1.38	27.67
40	14.75	2.26	0.54	0.09	0.05	0.89	0.58	4.41	0.85	3.69	28.12	1.46	29.58
45	15.99	2.44	0.56	0.09	0.05	0.89	0.58	4.67	0.90	3.91	30.08	1.55	31.62
50	17.28	2.65	0.57	0.09	0.05	0.89	0.58	4.96	0.96	4.15	32.17	1.64	33.81

Table VOC MAV 32
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.87	1.46	0.44	0.09	0.04	1.02	0.67	3.12	0.60	2.61	15.92	1.03	16.95
5	6.93	1.53	0.46	0.09	0.04	1.02	0.67	3.24	0.63	2.71	17.32	1.07	18.39
10	8.00	1.61	0.47	0.09	0.04	1.02	0.67	3.38	0.65	2.83	18.76	1.12	19.88
15	9.08	1.70	0.49	0.09	0.04	1.02	0.67	3.53	0.68	2.95	20.25	1.17	21.42
20	10.19	1.80	0.51	0.09	0.04	1.02	0.67	3.69	0.71	3.09	21.80	1.22	23.02
25	11.31	1.91	0.52	0.09	0.04	1.02	0.67	3.86	0.75	3.23	23.42	1.28	24.70
30	12.46	2.04	0.54	0.09	0.05	1.02	0.67	4.06	0.78	3.40	25.11	1.34	26.45
35	13.64	2.18	0.55	0.09	0.05	1.02	0.67	4.27	0.82	3.58	26.89	1.41	28.30
40	14.86	2.35	0.57	0.09	0.05	1.02	0.67	4.51	0.87	3.78	28.77	1.49	30.26
45	16.11	2.55	0.59	0.09	0.05	1.02	0.67	4.78	0.92	4.00	30.78	1.58	32.36
50	17.42	2.78	0.60	0.09	0.05	1.02	0.67	5.08	0.98	4.25	32.95	1.68	34.63

Table VOC MAV 33
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.80	0.78	0.16	0.07	0.01	0.26	0.17	2.69	0.52	2.25	12.71	0.89	13.60
5	6.79	0.80	0.18	0.07	0.01	0.26	0.17	2.79	0.54	2.33	13.94	0.92	14.86
10	7.80	0.82	0.20	0.07	0.01	0.26	0.17	2.89	0.56	2.42	15.19	0.96	16.15
15	8.82	0.85	0.21	0.07	0.02	0.26	0.17	3.00	0.58	2.51	16.48	0.99	17.48
20	9.86	0.87	0.23	0.07	0.02	0.26	0.17	3.12	0.60	2.62	17.81	1.03	18.84
25	10.91	0.89	0.24	0.07	0.02	0.26	0.17	3.26	0.63	2.73	19.17	1.08	20.25
30	11.98	0.92	0.26	0.07	0.02	0.26	0.17	3.40	0.66	2.85	20.57	1.12	21.70
35	13.06	0.95	0.28	0.07	0.02	0.26	0.17	3.56	0.69	2.98	22.02	1.18	23.20
40	14.17	0.98	0.29	0.07	0.02	0.26	0.17	3.73	0.72	3.12	23.53	1.23	24.76
45	15.31	1.01	0.31	0.07	0.03	0.26	0.17	3.91	0.75	3.28	25.09	1.30	26.39
50	16.47	1.05	0.33	0.07	0.03	0.26	0.17	4.12	0.80	3.45	26.73	1.36	28.09

Table VOC MAV 34
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.81	0.79	0.18	0.07	0.01	0.30	0.20	2.73	0.53	2.28	12.89	0.90	13.79
5	6.81	0.81	0.20	0.07	0.02	0.30	0.20	2.83	0.55	2.37	14.13	0.94	15.07
10	7.82	0.83	0.21	0.07	0.02	0.30	0.20	2.94	0.57	2.46	15.40	0.97	16.37
15	8.85	0.86	0.23	0.07	0.02	0.30	0.20	3.05	0.59	2.55	16.70	1.01	17.71
20	9.89	0.88	0.24	0.07	0.02	0.30	0.20	3.18	0.61	2.66	18.04	1.05	19.09
25	10.95	0.91	0.26	0.07	0.02	0.30	0.20	3.31	0.64	2.77	19.42	1.10	20.52
30	12.02	0.94	0.28	0.07	0.02	0.30	0.20	3.46	0.67	2.90	20.84	1.14	21.99
35	13.12	0.97	0.29	0.07	0.03	0.30	0.20	3.62	0.70	3.03	22.31	1.20	23.51
40	14.24	1.00	0.31	0.07	0.03	0.30	0.20	3.80	0.73	3.18	23.84	1.26	25.10
45	15.38	1.03	0.32	0.07	0.03	0.30	0.20	4.00	0.77	3.34	25.43	1.32	26.76
50	16.55	1.07	0.34	0.07	0.03	0.30	0.20	4.21	0.81	3.53	27.10	1.39	28.50

Table VOC MAV 35
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.82	0.80	0.19	0.07	0.02	0.34	0.22	2.77	0.53	2.32	13.09	0.92	14.00
5	6.82	0.82	0.21	0.07	0.02	0.34	0.22	2.87	0.55	2.40	14.34	0.95	15.29
10	7.84	0.85	0.23	0.07	0.02	0.34	0.22	2.98	0.57	2.49	15.62	0.99	16.61
15	8.88	0.87	0.24	0.07	0.02	0.34	0.22	3.10	0.60	2.59	16.94	1.03	17.97
20	9.92	0.90	0.26	0.07	0.02	0.34	0.22	3.23	0.62	2.70	18.29	1.07	19.36
25	10.99	0.92	0.28	0.07	0.03	0.34	0.22	3.37	0.65	2.82	19.69	1.11	20.80
30	12.07	0.95	0.29	0.07	0.03	0.34	0.22	3.52	0.68	2.95	21.13	1.17	22.30
35	13.18	0.98	0.31	0.07	0.03	0.34	0.22	3.69	0.71	3.09	22.62	1.22	23.85
40	14.30	1.01	0.32	0.07	0.03	0.34	0.22	3.88	0.75	3.24	24.18	1.28	25.46
45	15.46	1.05	0.34	0.07	0.03	0.34	0.22	4.08	0.79	3.41	25.80	1.35	27.15
50	16.64	1.08	0.36	0.07	0.03	0.34	0.22	4.31	0.83	3.60	27.50	1.42	28.93

Table VOC MAV 36
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.83	0.81	0.21	0.08	0.02	0.39	0.26	2.81	0.54	2.35	13.30	0.93	14.23
5	6.84	0.83	0.23	0.08	0.02	0.39	0.26	2.91	0.56	2.44	14.57	0.96	15.53
10	7.87	0.86	0.24	0.08	0.02	0.39	0.26	3.03	0.58	2.53	15.86	1.00	16.86
15	8.91	0.88	0.26	0.08	0.03	0.39	0.26	3.15	0.61	2.64	17.19	1.04	18.24
20	9.96	0.91	0.27	0.08	0.03	0.39	0.26	3.28	0.63	2.75	18.56	1.09	19.65
25	11.03	0.94	0.29	0.08	0.03	0.39	0.26	3.43	0.66	2.87	19.98	1.13	21.11
30	12.13	0.97	0.31	0.08	0.03	0.39	0.26	3.59	0.69	3.00	21.44	1.19	22.63
35	13.24	1.00	0.32	0.08	0.03	0.39	0.26	3.76	0.73	3.15	22.96	1.24	24.20
40	14.38	1.03	0.34	0.08	0.03	0.39	0.26	3.95	0.76	3.31	24.53	1.31	25.84
45	15.54	1.07	0.36	0.08	0.04	0.39	0.26	4.17	0.80	3.49	26.19	1.38	27.57
50	16.74	1.10	0.37	0.08	0.04	0.39	0.26	4.40	0.85	3.69	27.92	1.46	29.38

Table VOC MAV 37
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.85	0.82	0.23	0.08	0.02	0.45	0.30	2.85	0.55	2.38	13.53	0.94	14.48
5	6.87	0.85	0.24	0.08	0.03	0.45	0.30	2.96	0.57	2.48	14.81	0.98	15.79
10	7.90	0.87	0.26	0.08	0.03	0.45	0.30	3.07	0.59	2.57	16.12	1.02	17.14
15	8.94	0.90	0.27	0.08	0.03	0.45	0.30	3.20	0.62	2.68	17.47	1.06	18.53
20	10.00	0.92	0.29	0.08	0.03	0.45	0.30	3.34	0.64	2.80	18.85	1.11	19.96
25	11.08	0.95	0.31	0.08	0.03	0.45	0.30	3.49	0.67	2.92	20.29	1.16	21.44
30	12.18	0.98	0.32	0.08	0.03	0.45	0.30	3.66	0.70	3.06	21.77	1.21	22.98
35	13.30	1.01	0.34	0.08	0.04	0.45	0.30	3.84	0.74	3.21	23.31	1.27	24.58
40	14.45	1.05	0.35	0.08	0.04	0.45	0.30	4.04	0.78	3.38	24.92	1.34	26.25
45	15.63	1.09	0.37	0.08	0.04	0.45	0.30	4.26	0.82	3.56	26.60	1.41	28.01
50	16.85	1.12	0.39	0.08	0.04	0.45	0.30	4.51	0.87	3.77	28.38	1.49	29.87

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Table VOC MAV 38
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.87	0.83	0.24	0.08	0.03	0.52	0.34	2.89	0.56	2.42	13.78	0.96	14.74
5	6.89	0.86	0.26	0.08	0.03	0.52	0.34	3.00	0.58	2.51	15.07	0.99	16.07
10	7.93	0.88	0.27	0.08	0.03	0.52	0.34	3.12	0.60	2.62	16.40	1.03	17.43
15	8.98	0.91	0.29	0.08	0.03	0.52	0.34	3.26	0.63	2.73	17.76	1.08	18.84
20	10.05	0.94	0.31	0.08	0.03	0.52	0.34	3.40	0.66	2.84	19.17	1.12	20.29
25	11.13	0.97	0.32	0.08	0.04	0.52	0.34	3.55	0.69	2.98	20.62	1.18	21.79
30	12.24	1.00	0.34	0.08	0.04	0.52	0.34	3.73	0.72	3.12	22.12	1.23	23.36
35	13.37	1.03	0.35	0.08	0.04	0.52	0.34	3.91	0.75	3.28	23.69	1.30	24.98
40	14.54	1.07	0.37	0.08	0.04	0.52	0.34	4.12	0.80	3.45	25.33	1.36	26.69
45	15.73	1.10	0.39	0.08	0.04	0.52	0.34	4.35	0.84	3.64	27.05	1.44	28.49
50	16.96	1.15	0.40	0.08	0.04	0.52	0.34	4.61	0.89	3.86	28.86	1.53	30.39

Table VOC MAV 39
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.89	0.85	0.26	0.08	0.03	0.60	0.40	2.93	0.57	2.46	14.06	0.97	15.03
5	6.92	0.87	0.27	0.08	0.03	0.60	0.40	3.05	0.59	2.55	15.36	1.01	16.37
10	7.96	0.90	0.29	0.08	0.03	0.60	0.40	3.18	0.61	2.66	16.70	1.05	17.75
15	9.02	0.92	0.30	0.08	0.03	0.60	0.40	3.31	0.64	2.77	18.08	1.10	19.18
20	10.09	0.95	0.32	0.08	0.04	0.60	0.40	3.46	0.67	2.90	19.50	1.14	20.65
25	11.19	0.98	0.34	0.08	0.04	0.60	0.40	3.62	0.70	3.03	20.98	1.20	22.17
30	12.31	1.01	0.35	0.08	0.04	0.60	0.40	3.80	0.73	3.18	22.50	1.26	23.76
35	13.45	1.05	0.37	0.08	0.04	0.60	0.40	3.99	0.77	3.34	24.10	1.32	25.42
40	14.62	1.09	0.39	0.08	0.04	0.60	0.40	4.21	0.81	3.53	25.77	1.39	27.16
45	15.83	1.13	0.40	0.08	0.05	0.60	0.40	4.45	0.86	3.73	27.52	1.47	29.00
50	17.08	1.17	0.42	0.08	0.05	0.60	0.40	4.73	0.91	3.96	29.39	1.56	30.95

Table VOC MAV 40
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.91	0.86	0.27	0.09	0.03	0.69	0.45	2.98	0.57	2.49	14.36	0.99	15.34
5	6.95	0.88	0.29	0.09	0.03	0.69	0.45	3.10	0.60	2.59	15.68	1.03	16.70
10	7.99	0.91	0.30	0.09	0.04	0.69	0.45	3.23	0.62	2.70	17.03	1.07	18.10
15	9.06	0.94	0.32	0.09	0.04	0.69	0.45	3.37	0.65	2.82	18.43	1.11	19.54
20	10.14	0.97	0.34	0.09	0.04	0.69	0.45	3.52	0.68	2.95	19.87	1.17	21.03
25	11.25	1.00	0.35	0.09	0.04	0.69	0.45	3.69	0.71	3.09	21.36	1.22	22.58
30	12.37	1.03	0.37	0.09	0.04	0.69	0.45	3.87	0.75	3.24	22.92	1.28	24.20
35	13.53	1.07	0.38	0.09	0.05	0.69	0.45	4.08	0.79	3.41	24.54	1.35	25.89
40	14.71	1.11	0.40	0.09	0.05	0.69	0.45	4.31	0.83	3.60	26.24	1.42	27.66
45	15.94	1.15	0.42	0.09	0.05	0.69	0.45	4.56	0.88	3.82	28.04	1.51	29.55
50	17.21	1.19	0.43	0.09	0.05	0.69	0.45	4.84	0.93	4.05	29.95	1.60	31.55

Table VOC MAV 41
Economic Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	5.94	0.87	0.29	0.09	0.04	0.79	0.52	3.03	0.58	2.53	14.68	1.00	15.69
5	6.98	0.90	0.30	0.09	0.04	0.79	0.52	3.15	0.61	2.64	16.02	1.04	17.06
10	8.03	0.92	0.32	0.09	0.04	0.79	0.52	3.28	0.63	2.75	17.39	1.09	18.47
15	9.10	0.95	0.34	0.09	0.04	0.79	0.52	3.43	0.66	2.87	18.80	1.13	19.94
20	10.20	0.98	0.35	0.09	0.04	0.79	0.52	3.59	0.69	3.00	20.26	1.19	21.45
25	11.31	1.01	0.37	0.09	0.04	0.79	0.52	3.76	0.73	3.15	21.78	1.24	23.03
30	12.45	1.05	0.38	0.09	0.05	0.79	0.52	3.95	0.76	3.31	23.36	1.31	24.67
35	13.61	1.09	0.40	0.09	0.05	0.79	0.52	4.17	0.80	3.49	25.01	1.38	26.39
40	14.81	1.13	0.42	0.09	0.05	0.79	0.52	4.40	0.85	3.69	26.75	1.46	28.21
45	16.06	1.17	0.43	0.09	0.05	0.79	0.52	4.67	0.90	3.91	28.59	1.54	30.14
50	17.35	1.22	0.45	0.09	0.05	0.79	0.52	4.97	0.96	4.16	30.56	1.64	32.20

Table VOC MAV 42
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	10.33	2.39	0.51	0.13	0.02	0.91	0.34	3.73	1.08	2.62	22.06	1.04	23.09
5	12.38	2.53	0.54	0.13	0.03	0.91	0.34	3.86	1.11	2.71	24.54	1.07	25.61
10	14.46	2.68	0.57	0.13	0.03	0.91	0.34	4.00	1.15	2.80	27.07	1.11	28.18
15	16.55	2.85	0.61	0.13	0.03	0.91	0.34	4.14	1.20	2.91	29.67	1.15	30.82
20	18.68	3.05	0.64	0.13	0.04	0.91	0.34	4.30	1.24	3.02	32.34	1.19	33.54
25	20.83	3.27	0.67	0.13	0.04	0.91	0.34	4.47	1.29	3.14	35.10	1.24	36.34
30	23.01	3.53	0.71	0.13	0.05	0.91	0.34	4.66	1.34	3.27	37.95	1.29	39.24
35	25.23	3.84	0.74	0.13	0.05	0.91	0.34	4.86	1.40	3.41	40.91	1.35	42.26
40	27.49	4.20	0.77	0.13	0.05	0.91	0.34	5.08	1.47	3.56	44.01	1.41	45.41
45	29.80	4.64	0.81	0.13	0.06	0.91	0.34	5.32	1.54	3.73	47.27	1.48	48.74
50	32.16	5.19	0.84	0.13	0.06	0.91	0.34	5.58	1.61	3.92	50.74	1.55	52.29

Table VOC MAV 43
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	10.40	2.46	0.63	0.14	0.03	1.05	0.39	3.78	1.09	2.65	22.61	1.05	23.66
5	12.46	2.60	0.66	0.14	0.03	1.05	0.39	3.91	1.13	2.75	25.12	1.09	26.20
10	14.55	2.76	0.69	0.14	0.04	1.05	0.39	4.05	1.17	2.85	27.68	1.12	28.81
15	16.66	2.95	0.73	0.14	0.04	1.05	0.39	4.21	1.21	2.95	30.31	1.17	31.48
20	18.79	3.16	0.76	0.14	0.04	1.05	0.39	4.37	1.26	3.07	33.02	1.21	34.23
25	20.95	3.40	0.79	0.14	0.05	1.05	0.39	4.55	1.31	3.19	35.81	1.26	37.07
30	23.15	3.68	0.82	0.14	0.05	1.05	0.39	4.74	1.37	3.32	38.71	1.31	40.02
35	25.38	4.02	0.86	0.14	0.06	1.05	0.39	4.94	1.43	3.47	41.73	1.37	43.10
40	27.66	4.42	0.89	0.14	0.06	1.05	0.39	5.17	1.49	3.63	44.89	1.43	46.33
45	29.99	4.91	0.92	0.14	0.06	1.05	0.39	5.42	1.56	3.80	48.25	1.50	49.75
50	32.38	5.52	0.96	0.14	0.07	1.05	0.39	5.69	1.64	4.00	51.83	1.58	53.41

Table VOC MAV 44
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	10.48	2.53	0.74	0.15	0.04	1.20	0.44	3.83	1.11	2.69	23.21	1.06	24.28
5	12.55	2.68	0.78	0.15	0.04	1.20	0.44	3.97	1.15	2.78	25.74	1.10	26.84
10	14.64	2.85	0.81	0.15	0.04	1.20	0.44	4.11	1.19	2.89	28.33	1.14	29.47
15	16.76	3.05	0.84	0.15	0.05	1.20	0.44	4.27	1.23	3.00	30.99	1.18	32.18
20	18.91	3.28	0.88	0.15	0.05	1.20	0.44	4.44	1.28	3.11	33.74	1.23	34.97
25	21.08	3.54	0.91	0.15	0.06	1.20	0.44	4.62	1.33	3.24	36.57	1.28	37.86
30	23.29	3.84	0.94	0.15	0.06	1.20	0.44	4.82	1.39	3.38	39.52	1.34	40.86
35	25.55	4.21	0.98	0.15	0.06	1.20	0.44	5.03	1.45	3.53	42.60	1.40	44.00
40	27.84	4.65	1.01	0.15	0.07	1.20	0.44	5.27	1.52	3.70	45.85	1.46	47.31
45	30.19	5.20	1.04	0.15	0.07	1.20	0.44	5.53	1.60	3.88	49.30	1.53	50.83
50	32.61	5.89	1.07	0.15	0.07	1.20	0.44	5.81	1.68	4.08	53.01	1.61	54.63

Table VOC MAV 45
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	10.56	2.60	0.86	0.15	0.04	1.39	0.51	3.89	1.12	2.73	23.85	1.08	24.93
5	12.64	2.77	0.89	0.15	0.05	1.39	0.51	4.02	1.16	2.82	26.41	1.12	27.53
10	14.74	2.95	0.93	0.15	0.05	1.39	0.51	4.17	1.20	2.93	29.03	1.16	30.19
15	16.87	3.16	0.96	0.15	0.05	1.39	0.51	4.33	1.25	3.04	31.73	1.20	32.93
20	19.03	3.40	0.99	0.15	0.06	1.39	0.51	4.51	1.30	3.16	34.51	1.25	35.76
25	21.22	3.69	1.03	0.15	0.06	1.39	0.51	4.70	1.36	3.30	37.39	1.30	38.70
30	23.45	4.02	1.06	0.15	0.07	1.39	0.51	4.90	1.41	3.44	40.40	1.36	41.76
35	25.71	4.42	1.09	0.15	0.07	1.39	0.51	5.12	1.48	3.60	43.55	1.42	44.97
40	28.03	4.91	1.13	0.15	0.07	1.39	0.51	5.37	1.55	3.77	46.88	1.49	48.37
45	30.41	5.53	1.16	0.15	0.08	1.39	0.51	5.64	1.63	3.96	50.44	1.56	52.01
50	32.86	6.32	1.19	0.15	0.08	1.39	0.51	5.93	1.71	4.16	54.31	1.65	55.95

Table VOC MAV 46
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	10.65	2.68	0.98	0.16	0.05	1.60	0.59	3.94	1.14	2.76	24.54	1.09	25.64
5	12.73	2.86	1.01	0.16	0.05	1.60	0.59	4.08	1.18	2.87	27.13	1.13	28.26
10	14.85	3.05	1.05	0.16	0.06	1.60	0.59	4.24	1.22	2.97	29.78	1.18	30.95
15	16.99	3.28	1.08	0.16	0.06	1.60	0.59	4.40	1.27	3.09	32.51	1.22	33.73
20	19.16	3.54	1.11	0.16	0.06	1.60	0.59	4.58	1.32	3.22	35.34	1.27	36.61
25	21.36	3.85	1.14	0.16	0.07	1.60	0.59	4.78	1.38	3.35	38.27	1.32	39.60
30	23.60	4.22	1.18	0.16	0.07	1.60	0.59	4.99	1.44	3.50	41.34	1.38	42.72
35	25.89	4.66	1.21	0.16	0.08	1.60	0.59	5.22	1.51	3.66	44.57	1.45	46.02
40	28.23	5.21	1.24	0.16	0.08	1.60	0.59	5.47	1.58	3.84	48.00	1.52	49.52
45	30.63	5.90	1.28	0.16	0.08	1.60	0.59	5.75	1.66	4.04	51.69	1.60	53.28
50	33.11	6.81	1.31	0.16	0.09	1.60	0.59	6.06	1.75	4.25	55.73	1.68	57.41

Table VOC MAV 47
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	10.73	2.77	1.10	0.16	0.06	1.84	0.68	4.00	1.15	2.80	25.29	1.11	26.40
5	12.83	2.95	1.13	0.16	0.06	1.84	0.68	4.14	1.20	2.91	27.90	1.15	29.05
10	14.95	3.16	1.16	0.16	0.06	1.84	0.68	4.30	1.24	3.02	30.59	1.19	31.78
15	17.11	3.41	1.20	0.16	0.07	1.84	0.68	4.47	1.29	3.14	33.36	1.24	34.60
20	19.29	3.69	1.23	0.16	0.07	1.84	0.68	4.66	1.34	3.27	36.23	1.29	37.52
25	21.51	4.03	1.26	0.16	0.08	1.84	0.68	4.86	1.40	3.41	39.22	1.35	40.57
30	23.77	4.43	1.30	0.16	0.08	1.84	0.68	5.08	1.47	3.56	42.36	1.41	43.77
35	26.07	4.92	1.33	0.16	0.08	1.84	0.68	5.32	1.53	3.73	45.67	1.47	47.15
40	28.44	5.54	1.36	0.16	0.09	1.84	0.68	5.58	1.61	3.92	49.21	1.55	50.76
45	30.87	6.33	1.39	0.16	0.09	1.84	0.68	5.87	1.69	4.12	53.05	1.63	54.68
50	33.39	7.39	1.43	0.16	0.09	1.84	0.68	6.19	1.79	4.35	57.31	1.72	59.02

Table VOC MAV 48
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	10.83	2.86	1.21	0.17	0.06	2.12	0.78	4.05	1.17	2.84	26.10	1.12	27.22
5	12.93	3.06	1.25	0.17	0.07	2.12	0.78	4.20	1.21	2.95	28.74	1.17	29.91
10	15.07	3.28	1.28	0.17	0.07	2.12	0.78	4.37	1.26	3.06	31.46	1.21	32.68
15	17.23	3.55	1.31	0.17	0.07	2.12	0.78	4.54	1.31	3.19	34.28	1.26	35.54
20	19.43	3.85	1.35	0.17	0.08	2.12	0.78	4.73	1.37	3.32	37.20	1.31	38.51
25	21.66	4.22	1.38	0.17	0.08	2.12	0.78	4.94	1.43	3.47	40.25	1.37	41.62
30	23.94	4.67	1.41	0.17	0.09	2.12	0.78	5.17	1.49	3.63	43.46	1.43	44.90
35	26.27	5.22	1.45	0.17	0.09	2.12	0.78	5.42	1.56	3.80	46.87	1.50	48.38
40	28.66	5.91	1.48	0.17	0.09	2.12	0.78	5.69	1.64	4.00	50.54	1.58	52.12
45	31.12	6.82	1.51	0.17	0.10	2.12	0.78	6.00	1.73	4.21	54.56	1.66	56.22
50	33.68	8.07	1.55	0.17	0.10	2.12	0.78	6.33	1.83	4.44	59.07	1.76	60.82

Table VOC MAV 49
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	10.92	2.96	1.33	0.18	0.07	2.44	0.90	4.11	1.19	2.89	26.98	1.14	28.12
5	13.04	3.17	1.37	0.18	0.07	2.44	0.90	4.27	1.23	3.00	29.65	1.18	30.84
10	15.18	3.41	1.40	0.18	0.08	2.44	0.90	4.44	1.28	3.11	32.42	1.23	33.65
15	17.36	3.70	1.43	0.18	0.08	2.44	0.90	4.62	1.33	3.24	35.28	1.28	36.56
20	19.57	4.03	1.46	0.18	0.08	2.44	0.90	4.82	1.39	3.38	38.25	1.34	39.59
25	21.82	4.44	1.50	0.18	0.09	2.44	0.90	5.03	1.45	3.53	41.37	1.40	42.77
30	24.12	4.93	1.53	0.18	0.09	2.44	0.90	5.27	1.52	3.70	44.67	1.46	46.13
35	26.47	5.55	1.56	0.18	0.10	2.44	0.90	5.52	1.59	3.88	48.19	1.53	49.72
40	28.89	6.34	1.60	0.18	0.10	2.44	0.90	5.81	1.68	4.08	52.01	1.61	53.62
45	31.39	7.40	1.63	0.18	0.10	2.44	0.90	6.13	1.77	4.30	56.23	1.70	57.93
50	33.99	8.89	1.66	0.18	0.11	2.44	0.90	6.48	1.87	4.55	61.06	1.80	62.86

Table VOC MAV 50
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.02	3.06	1.45	0.18	0.08	2.81	1.04	4.17	1.20	2.93	27.94	1.16	29.10
5	13.15	3.29	1.48	0.18	0.08	2.81	1.04	4.33	1.25	3.04	30.65	1.20	31.85
10	15.31	3.55	1.52	0.18	0.08	2.81	1.04	4.51	1.30	3.16	33.45	1.25	34.70
15	17.50	3.86	1.55	0.18	0.09	2.81	1.04	4.69	1.36	3.29	36.36	1.30	37.67
20	19.72	4.23	1.58	0.18	0.09	2.81	1.04	4.90	1.41	3.44	39.40	1.36	40.76
25	21.99	4.67	1.62	0.18	0.09	2.81	1.04	5.12	1.48	3.59	42.60	1.42	44.02
30	24.31	5.23	1.65	0.18	0.10	2.81	1.04	5.37	1.55	3.77	45.99	1.49	47.48
35	26.68	5.92	1.68	0.18	0.10	2.81	1.04	5.63	1.63	3.95	49.63	1.56	51.20
40	29.13	6.84	1.71	0.18	0.11	2.81	1.04	5.93	1.71	4.16	53.63	1.65	55.27
45	31.67	8.09	1.75	0.18	0.11	2.81	1.04	6.26	1.81	4.39	58.11	1.74	59.84
50	34.32	9.90	1.78	0.18	0.11	2.81	1.04	6.63	1.91	4.65	63.34	1.84	65.18

Table VOC MAV 51
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 11000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.12	3.17	1.57	0.19	0.08	3.23	1.19	4.24	1.22	2.97	28.99	1.17	30.16
5	13.26	3.41	1.60	0.19	0.09	3.23	1.19	4.40	1.27	3.09	31.74	1.22	32.96
10	15.43	3.70	1.63	0.19	0.09	3.23	1.19	4.58	1.32	3.21	34.59	1.27	35.86
15	17.64	4.04	1.67	0.19	0.09	3.23	1.19	4.77	1.38	3.35	37.55	1.32	38.88
20	19.88	4.44	1.70	0.19	0.10	3.23	1.19	4.99	1.44	3.50	40.66	1.38	42.04
25	22.17	4.94	1.73	0.19	0.10	3.23	1.19	5.22	1.51	3.66	43.94	1.45	45.38
30	24.51	5.56	1.77	0.19	0.11	3.23	1.19	5.47	1.58	3.84	47.44	1.52	48.96
35	26.91	6.36	1.80	0.19	0.11	3.23	1.19	5.75	1.66	4.03	51.23	1.60	52.83
40	29.39	7.42	1.83	0.19	0.11	3.23	1.19	6.06	1.75	4.25	55.43	1.68	57.11
45	31.97	8.92	1.87	0.19	0.12	3.23	1.19	6.40	1.85	4.49	60.23	1.78	62.00
50	34.68	11.17	1.90	0.19	0.12	3.23	1.19	6.79	1.96	4.77	65.99	1.88	67.87

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Table VOC MAV 52
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 12000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.23	3.29	1.68	0.20	0.09	3.72	1.37	4.30	1.24	3.02	30.15	1.19	31.34
5	13.38	3.55	1.72	0.20	0.09	3.72	1.37	4.47	1.29	3.14	32.94	1.24	34.18
10	15.57	3.86	1.75	0.20	0.10	3.72	1.37	4.66	1.34	3.27	35.84	1.29	37.13
15	17.78	4.23	1.78	0.20	0.10	3.72	1.37	4.86	1.40	3.41	38.86	1.35	40.21
20	20.04	4.68	1.82	0.20	0.10	3.72	1.37	5.08	1.46	3.56	42.04	1.41	43.45
25	22.35	5.23	1.85	0.20	0.11	3.72	1.37	5.31	1.53	3.73	45.41	1.47	46.89
30	24.71	5.94	1.88	0.20	0.11	3.72	1.37	5.58	1.61	3.91	49.04	1.55	50.59
35	27.15	6.86	1.92	0.20	0.12	3.72	1.37	5.87	1.69	4.12	53.01	1.63	54.64
40	29.66	8.11	1.95	0.20	0.12	3.72	1.37	6.19	1.79	4.35	57.46	1.72	59.18
45	32.29	9.93	1.98	0.20	0.12	3.72	1.37	6.55	1.89	4.60	62.66	1.82	64.48
50	35.06	12.81	2.02	0.20	0.13	3.72	1.37	6.96	2.01	4.88	69.15	1.93	71.08

Table VOC MAV 53
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 13000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.35	3.42	1.80	0.20	0.10	4.28	1.58	4.37	1.26	3.06	31.42	1.21	32.63
5	13.51	3.70	1.84	0.20	0.10	4.28	1.58	4.54	1.31	3.19	34.26	1.26	35.52
10	15.70	4.04	1.87	0.20	0.10	4.28	1.58	4.73	1.37	3.32	37.21	1.31	38.52
15	17.94	4.45	1.90	0.20	0.11	4.28	1.58	4.94	1.43	3.47	40.30	1.37	41.67
20	20.22	4.95	1.93	0.20	0.11	4.28	1.58	5.17	1.49	3.63	43.56	1.43	45.00
25	22.54	5.57	1.97	0.20	0.11	4.28	1.58	5.42	1.56	3.80	47.05	1.50	48.55
30	24.93	6.37	2.00	0.20	0.12	4.28	1.58	5.69	1.64	3.99	50.82	1.58	52.40
35	27.40	7.44	2.03	0.20	0.12	4.28	1.58	5.99	1.73	4.21	54.99	1.66	56.65
40	29.95	8.94	2.07	0.20	0.13	4.28	1.58	6.33	1.83	4.44	59.76	1.76	61.52
45	32.63	11.21	2.10	0.20	0.13	4.28	1.58	6.71	1.94	4.71	65.49	1.86	67.35
50	35.47	15.01	2.13	0.20	0.13	4.28	1.58	7.13	2.06	5.01	73.01	1.98	74.99

Table VOC MAV 54
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 14000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.46	3.56	1.92	0.21	0.10	4.93	1.82	4.43	1.28	3.11	32.83	1.23	34.06
5	13.64	3.87	1.95	0.21	0.11	4.93	1.82	4.62	1.33	3.24	35.72	1.28	37.00
10	15.85	4.24	1.99	0.21	0.11	4.93	1.82	4.81	1.39	3.38	38.73	1.34	40.07
15	18.10	4.69	2.02	0.21	0.11	4.93	1.82	5.03	1.45	3.53	41.89	1.40	43.29
20	20.40	5.24	2.05	0.21	0.12	4.93	1.82	5.26	1.52	3.69	45.25	1.46	46.71
25	22.75	5.95	2.09	0.21	0.12	4.93	1.82	5.52	1.59	3.88	48.86	1.53	50.39
30	25.16	6.87	2.12	0.21	0.13	4.93	1.82	5.81	1.68	4.08	52.80	1.61	54.41
35	27.66	8.14	2.15	0.21	0.13	4.93	1.82	6.12	1.77	4.30	57.23	1.70	58.93
40	30.26	9.97	2.18	0.21	0.13	4.93	1.82	6.48	1.87	4.54	62.40	1.80	64.20
45	33.00	12.86	2.22	0.21	0.14	4.93	1.82	6.87	1.98	4.82	68.85	1.91	70.76
50	35.92	18.13	2.25	0.21	0.14	4.93	1.82	7.32	2.11	5.14	77.97	2.03	80.00

Table VOC MAV 55
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Single Lane Roads (Rs/km)

Roughness = 15000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.58	3.71	2.04	0.22	0.11	5.68	2.10	4.51	1.30	3.16	34.40	1.25	35.65
5	13.77	4.05	2.07	0.22	0.11	5.68	2.10	4.69	1.35	3.29	37.34	1.30	38.64
10	16.00	4.46	2.10	0.22	0.12	5.68	2.10	4.90	1.41	3.44	40.42	1.36	41.78
15	18.27	4.96	2.14	0.22	0.12	5.68	2.10	5.12	1.48	3.59	43.66	1.42	45.08
20	20.58	5.58	2.17	0.22	0.12	5.68	2.10	5.36	1.55	3.76	47.13	1.49	48.62
25	22.96	6.38	2.20	0.22	0.13	5.68	2.10	5.63	1.63	3.95	50.88	1.56	52.44
30	25.41	7.46	2.24	0.22	0.13	5.68	2.10	5.93	1.71	4.16	55.03	1.65	56.67
35	27.94	8.97	2.27	0.22	0.14	5.68	2.10	6.26	1.81	4.39	59.77	1.74	61.51
40	30.59	11.25	2.30	0.22	0.14	5.68	2.10	6.63	1.91	4.65	65.47	1.84	67.31
45	33.40	15.09	2.34	0.22	0.14	5.68	2.10	7.04	2.03	4.94	72.97	1.95	74.92
50	36.41	22.88	2.37	0.22	0.15	5.68	2.10	7.51	2.17	5.27	84.75	2.08	86.84

Table VOC MAV 56
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	10.65	2.00	0.43	0.13	0.02	0.68	0.25	3.48	1.00	2.44	21.10	0.97	22.06
5	12.65	2.10	0.47	0.13	0.03	0.68	0.25	3.60	1.04	2.53	23.47	1.00	24.47
10	14.67	2.20	0.50	0.13	0.03	0.68	0.25	3.73	1.08	2.62	25.89	1.04	26.92
15	16.71	2.32	0.53	0.13	0.03	0.68	0.25	3.87	1.12	2.72	28.36	1.07	29.44
20	18.78	2.45	0.57	0.13	0.04	0.68	0.25	4.03	1.16	2.83	30.90	1.12	32.02
25	20.87	2.59	0.60	0.13	0.04	0.68	0.25	4.19	1.21	2.94	33.51	1.16	34.67
30	23.00	2.75	0.63	0.13	0.05	0.68	0.25	4.37	1.26	3.07	36.19	1.21	37.40
35	25.17	2.93	0.67	0.13	0.05	0.68	0.25	4.57	1.32	3.20	38.96	1.27	40.23
40	27.37	3.14	0.70	0.13	0.05	0.68	0.25	4.78	1.38	3.35	41.84	1.33	43.16
45	29.63	3.38	0.73	0.13	0.06	0.68	0.25	5.01	1.45	3.52	44.83	1.39	46.22
50	31.94	3.66	0.76	0.13	0.06	0.68	0.25	5.27	1.52	3.70	47.97	1.46	49.43

Table VOC MAV 57
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	10.71	2.05	0.51	0.14	0.03	0.78	0.29	3.53	1.02	2.47	21.52	0.98	22.50
5	12.71	2.15	0.55	0.14	0.03	0.78	0.29	3.65	1.05	2.56	23.91	1.01	24.93
10	14.74	2.26	0.58	0.14	0.04	0.78	0.29	3.79	1.09	2.66	26.36	1.05	27.41
15	16.79	2.38	0.61	0.14	0.04	0.78	0.29	3.93	1.14	2.76	28.86	1.09	29.95
20	18.87	2.52	0.65	0.14	0.04	0.78	0.29	4.09	1.18	2.87	31.42	1.13	32.56
25	20.98	2.67	0.68	0.14	0.05	0.78	0.29	4.26	1.23	2.99	34.06	1.18	35.24
30	23.12	2.84	0.71	0.14	0.05	0.78	0.29	4.44	1.28	3.12	36.78	1.23	38.01
35	25.30	3.04	0.75	0.14	0.06	0.78	0.29	4.65	1.34	3.26	39.59	1.29	40.88
40	27.53	3.26	0.78	0.14	0.06	0.78	0.29	4.87	1.41	3.42	42.52	1.35	43.87
45	29.80	3.52	0.81	0.14	0.06	0.78	0.29	5.11	1.48	3.59	45.57	1.42	46.99
50	32.13	3.82	0.84	0.14	0.07	0.78	0.29	5.38	1.55	3.78	48.78	1.49	50.27

Table VOC MAV 58
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	10.76	2.10	0.59	0.15	0.04	0.90	0.33	3.57	1.03	2.51	21.98	0.99	22.97
5	12.77	2.21	0.63	0.15	0.04	0.90	0.33	3.70	1.07	2.60	24.39	1.03	25.42
10	14.81	2.32	0.66	0.15	0.04	0.90	0.33	3.84	1.11	2.70	26.86	1.07	27.92
15	16.87	2.45	0.69	0.15	0.05	0.90	0.33	3.99	1.15	2.80	29.38	1.11	30.49
20	18.96	2.59	0.73	0.15	0.05	0.90	0.33	4.16	1.20	2.92	31.98	1.15	33.13
25	21.09	2.75	0.76	0.15	0.06	0.90	0.33	4.33	1.25	3.04	34.65	1.20	35.85
30	23.24	2.94	0.79	0.15	0.06	0.90	0.33	4.52	1.31	3.17	37.41	1.25	38.66
35	25.44	3.15	0.83	0.15	0.06	0.90	0.33	4.73	1.37	3.32	40.26	1.31	41.58
40	27.68	3.39	0.86	0.15	0.07	0.90	0.33	4.96	1.43	3.48	43.24	1.38	44.62
45	29.98	3.67	0.89	0.15	0.07	0.90	0.33	5.21	1.50	3.66	46.36	1.45	47.80
50	32.34	4.00	0.92	0.15	0.07	0.90	0.33	5.49	1.59	3.86	49.64	1.52	51.16

Table VOC MAV 59

Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	10.82	2.15	0.67	0.15	0.04	1.03	0.38	3.62	1.05	2.54	22.47	1.01	23.47
5	12.84	2.26	0.71	0.15	0.05	1.03	0.38	3.76	1.08	2.64	24.90	1.04	25.94
10	14.89	2.38	0.74	0.15	0.05	1.03	0.38	3.90	1.13	2.74	27.39	1.08	28.47
15	16.96	2.52	0.77	0.15	0.05	1.03	0.38	4.06	1.17	2.85	29.95	1.13	31.07
20	19.06	2.67	0.81	0.15	0.06	1.03	0.38	4.22	1.22	2.96	32.57	1.17	33.74
25	21.20	2.84	0.84	0.15	0.06	1.03	0.38	4.40	1.27	3.09	35.28	1.22	36.50
30	23.37	3.04	0.87	0.15	0.07	1.03	0.38	4.60	1.33	3.23	38.08	1.28	39.35
35	25.59	3.26	0.91	0.15	0.07	1.03	0.38	4.82	1.39	3.38	40.98	1.34	42.32
40	27.85	3.52	0.94	0.15	0.07	1.03	0.38	5.06	1.46	3.55	44.01	1.40	45.42
45	30.17	3.83	0.97	0.15	0.08	1.03	0.38	5.32	1.54	3.73	47.20	1.48	48.67
50	32.56	4.19	1.01	0.15	0.08	1.03	0.38	5.61	1.62	3.94	50.57	1.56	52.12

Table VOC MAV 60

Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	10.88	2.21	0.75	0.16	0.05	1.19	0.44	3.68	1.06	2.58	22.99	1.02	24.01
5	12.91	2.32	0.79	0.16	0.05	1.19	0.44	3.81	1.10	2.68	25.45	1.06	26.51
10	14.97	2.45	0.82	0.16	0.06	1.19	0.44	3.96	1.14	2.78	27.97	1.10	29.06
15	17.05	2.60	0.85	0.16	0.06	1.19	0.44	4.12	1.19	2.89	30.55	1.14	31.69
20	19.17	2.76	0.89	0.16	0.06	1.19	0.44	4.29	1.24	3.01	33.21	1.19	34.40
25	21.32	2.94	0.92	0.16	0.07	1.19	0.44	4.48	1.29	3.14	35.95	1.24	37.19
30	23.51	3.15	0.95	0.16	0.07	1.19	0.44	4.69	1.35	3.29	38.79	1.30	40.09
35	25.74	3.39	0.99	0.16	0.08	1.19	0.44	4.91	1.42	3.45	41.75	1.36	43.11
40	28.02	3.67	1.02	0.16	0.08	1.19	0.44	5.16	1.49	3.62	44.84	1.43	46.28
45	30.37	4.00	1.05	0.16	0.08	1.19	0.44	5.43	1.57	3.81	48.10	1.51	49.61
50	32.79	4.40	1.09	0.16	0.09	1.19	0.44	5.74	1.66	4.03	51.56	1.59	53.15

Table VOC MAV 61
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	10.95	2.26	0.83	0.16	0.06	1.37	0.50	3.73	1.08	2.62	23.56	1.03	24.60
5	12.99	2.39	0.87	0.16	0.06	1.37	0.50	3.87	1.12	2.72	26.04	1.07	27.12
10	15.06	2.52	0.90	0.16	0.06	1.37	0.50	4.02	1.16	2.82	28.58	1.12	29.70
15	17.15	2.67	0.93	0.16	0.07	1.37	0.50	4.19	1.21	2.94	31.20	1.16	32.36
20	19.28	2.85	0.97	0.16	0.07	1.37	0.50	4.36	1.26	3.06	33.89	1.21	35.10
25	21.45	3.04	1.00	0.16	0.08	1.37	0.50	4.56	1.32	3.20	36.67	1.26	37.94
30	23.65	3.27	1.03	0.16	0.08	1.37	0.50	4.77	1.38	3.35	39.56	1.32	40.89
35	25.90	3.53	1.07	0.16	0.08	1.37	0.50	5.01	1.44	3.51	42.58	1.39	43.97
40	28.21	3.83	1.10	0.16	0.09	1.37	0.50	5.26	1.52	3.69	45.74	1.46	47.20
45	30.58	4.20	1.13	0.16	0.09	1.37	0.50	5.55	1.60	3.89	49.08	1.54	50.62
50	33.03	4.63	1.17	0.16	0.09	1.37	0.50	5.87	1.69	4.12	52.64	1.63	54.27

Table VOC MAV 62
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.02	2.32	0.91	0.17	0.06	1.57	0.58	3.78	1.09	2.65	24.18	1.05	25.23
5	13.07	2.45	0.95	0.17	0.07	1.57	0.58	3.93	1.13	2.76	26.68	1.09	27.77
10	15.15	2.60	0.98	0.17	0.07	1.57	0.58	4.09	1.18	2.87	29.25	1.13	30.39
15	17.26	2.76	1.01	0.17	0.07	1.57	0.58	4.25	1.23	2.99	31.90	1.18	33.08
20	19.40	2.94	1.05	0.17	0.08	1.57	0.58	4.44	1.28	3.12	34.63	1.23	35.86
25	21.58	3.15	1.08	0.17	0.08	1.57	0.58	4.64	1.34	3.26	37.46	1.29	38.74
30	23.80	3.39	1.11	0.17	0.09	1.57	0.58	4.86	1.40	3.41	40.40	1.35	41.74
35	26.07	3.68	1.15	0.17	0.09	1.57	0.58	5.10	1.47	3.58	43.47	1.42	44.88
40	28.40	4.01	1.18	0.17	0.09	1.57	0.58	5.37	1.55	3.77	46.70	1.49	48.19
45	30.80	4.41	1.21	0.17	0.10	1.57	0.58	5.67	1.64	3.98	50.13	1.57	51.70
50	33.30	4.89	1.25	0.17	0.10	1.57	0.58	6.00	1.73	4.21	53.81	1.67	55.47

Table VOC MAV 63
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.09	2.39	1.00	0.18	0.07	1.81	0.67	3.84	1.11	2.69	24.84	1.07	25.91
5	13.15	2.52	1.03	0.18	0.07	1.81	0.67	3.99	1.15	2.80	27.38	1.11	28.48
10	15.24	2.68	1.06	0.18	0.08	1.81	0.67	4.15	1.20	2.91	29.98	1.15	31.13
15	17.36	2.85	1.09	0.18	0.08	1.81	0.67	4.33	1.25	3.04	32.66	1.20	33.86
20	19.52	3.05	1.13	0.18	0.08	1.81	0.67	4.52	1.30	3.17	35.43	1.25	36.68
25	21.72	3.27	1.16	0.18	0.09	1.81	0.67	4.73	1.36	3.32	38.30	1.31	39.61
30	23.96	3.53	1.19	0.18	0.09	1.81	0.67	4.95	1.43	3.48	41.29	1.37	42.67
35	26.25	3.84	1.23	0.18	0.10	1.81	0.67	5.21	1.50	3.65	44.43	1.44	45.88
40	28.61	4.20	1.26	0.18	0.10	1.81	0.67	5.49	1.58	3.85	47.75	1.52	49.27
45	31.04	4.64	1.29	0.18	0.10	1.81	0.67	5.80	1.67	4.07	51.28	1.61	52.88
50	33.58	5.19	1.33	0.18	0.11	1.81	0.67	6.14	1.77	4.31	55.08	1.70	56.79

Table VOC MAV 64
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Intermediate Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.17	2.46	1.08	0.18	0.08	2.09	0.77	3.90	1.12	2.73	25.57	1.08	26.65
5	13.24	2.60	1.11	0.18	0.08	2.09	0.77	4.05	1.17	2.84	28.13	1.12	29.26
10	15.34	2.76	1.14	0.18	0.08	2.09	0.77	4.22	1.22	2.96	30.77	1.17	31.94
15	17.48	2.95	1.17	0.18	0.09	2.09	0.77	4.40	1.27	3.09	33.48	1.22	34.70
20	19.65	3.16	1.21	0.18	0.09	2.09	0.77	4.60	1.33	3.23	36.29	1.28	37.57
25	21.86	3.40	1.24	0.18	0.09	2.09	0.77	4.81	1.39	3.38	39.22	1.34	40.55
30	24.12	3.68	1.27	0.18	0.10	2.09	0.77	5.05	1.46	3.54	42.27	1.40	43.67
35	26.44	4.01	1.31	0.18	0.10	2.09	0.77	5.31	1.53	3.73	45.48	1.47	46.95
40	28.83	4.41	1.34	0.18	0.11	2.09	0.77	5.60	1.62	3.93	48.88	1.55	50.44
45	31.30	4.90	1.37	0.18	0.11	2.09	0.77	5.93	1.71	4.16	52.52	1.64	54.17
50	33.87	5.51	1.41	0.18	0.11	2.09	0.77	6.29	1.82	4.42	56.47	1.75	58.22

Table VOC MAV 65
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	10.95	1.76	0.40	0.13	0.02	0.59	0.22	3.31	0.96	2.32	20.67	0.92	21.59
5	12.90	1.83	0.43	0.13	0.03	0.59	0.22	3.43	0.99	2.41	22.96	0.95	23.92
10	14.88	1.91	0.47	0.13	0.03	0.59	0.22	3.56	1.03	2.50	25.31	0.99	26.29
15	16.88	2.00	0.50	0.13	0.03	0.59	0.22	3.69	1.07	2.59	27.70	1.02	28.73
20	18.90	2.09	0.53	0.13	0.04	0.59	0.22	3.84	1.11	2.70	30.15	1.07	31.22
25	20.96	2.20	0.56	0.13	0.04	0.59	0.22	4.00	1.15	2.81	32.67	1.11	33.78
30	23.05	2.31	0.60	0.13	0.05	0.59	0.22	4.17	1.21	2.93	35.25	1.16	36.41
35	25.17	2.44	0.63	0.13	0.05	0.59	0.22	4.36	1.26	3.06	37.92	1.21	39.13
40	27.34	2.58	0.66	0.13	0.05	0.59	0.22	4.57	1.32	3.21	40.68	1.27	41.95
45	29.55	2.74	0.70	0.13	0.06	0.59	0.22	4.80	1.39	3.37	43.54	1.33	44.87
50	31.81	2.92	0.73	0.13	0.06	0.59	0.22	5.05	1.46	3.55	46.53	1.40	47.93

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Table VOC MAV 66
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	10.99	1.80	0.46	0.14	0.03	0.68	0.25	3.36	0.97	2.36	21.03	0.93	21.96
5	12.95	1.87	0.50	0.14	0.03	0.68	0.25	3.48	1.00	2.44	23.34	0.97	24.31
10	14.93	1.96	0.53	0.14	0.04	0.68	0.25	3.61	1.04	2.53	25.71	1.00	26.71
15	16.94	2.05	0.56	0.14	0.04	0.68	0.25	3.75	1.08	2.63	28.12	1.04	29.16
20	18.98	2.15	0.59	0.14	0.04	0.68	0.25	3.90	1.13	2.74	30.60	1.08	31.68
25	21.05	2.26	0.63	0.14	0.05	0.68	0.25	4.07	1.17	2.85	33.14	1.13	34.27
30	23.15	2.38	0.66	0.14	0.05	0.68	0.25	4.25	1.23	2.98	35.76	1.18	36.94
35	25.29	2.51	0.69	0.14	0.06	0.68	0.25	4.44	1.28	3.12	38.46	1.23	39.70
40	27.47	2.66	0.73	0.14	0.06	0.68	0.25	4.66	1.34	3.27	41.26	1.29	42.56
45	29.70	2.83	0.76	0.14	0.06	0.68	0.25	4.90	1.41	3.44	44.17	1.36	45.53
50	31.99	3.03	0.79	0.14	0.07	0.68	0.25	5.16	1.49	3.62	47.22	1.43	48.65

Table VOC MAV 67
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.02	1.84	0.53	0.15	0.04	0.78	0.29	3.40	0.98	2.39	21.41	0.94	22.36
5	12.99	1.91	0.56	0.15	0.04	0.78	0.29	3.53	1.02	2.48	23.75	0.98	24.73
10	14.99	2.00	0.59	0.15	0.04	0.78	0.29	3.66	1.06	2.57	26.13	1.02	27.15
15	17.01	2.10	0.62	0.15	0.05	0.78	0.29	3.81	1.10	2.67	28.57	1.06	29.63
20	19.06	2.20	0.66	0.15	0.05	0.78	0.29	3.97	1.14	2.78	31.08	1.10	32.18
25	21.14	2.31	0.69	0.15	0.06	0.78	0.29	4.14	1.19	2.90	33.65	1.15	34.80
30	23.26	2.44	0.72	0.15	0.06	0.78	0.29	4.32	1.25	3.03	36.30	1.20	37.50
35	25.41	2.59	0.76	0.15	0.06	0.78	0.29	4.53	1.31	3.18	39.04	1.26	40.30
40	27.61	2.75	0.79	0.15	0.07	0.78	0.29	4.75	1.37	3.33	41.89	1.32	43.20
45	29.87	2.93	0.82	0.15	0.07	0.78	0.29	5.00	1.44	3.51	44.85	1.39	46.24
50	32.18	3.13	0.86	0.15	0.07	0.78	0.29	5.27	1.52	3.70	47.95	1.46	49.42

Table VOC MAV 68
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.06	1.87	0.59	0.15	0.04	0.90	0.33	3.45	1.00	2.42	21.83	0.96	22.79
5	13.04	1.96	0.62	0.15	0.05	0.90	0.33	3.58	1.03	2.51	24.18	0.99	25.18
10	15.05	2.05	0.65	0.15	0.05	0.90	0.33	3.72	1.07	2.61	26.59	1.03	27.62
15	17.08	2.15	0.69	0.15	0.05	0.90	0.33	3.87	1.12	2.72	29.06	1.07	30.13
20	19.14	2.26	0.72	0.15	0.06	0.90	0.33	4.03	1.16	2.83	31.59	1.12	32.71
25	21.24	2.38	0.75	0.15	0.06	0.90	0.33	4.21	1.21	2.95	34.19	1.17	35.36
30	23.37	2.51	0.79	0.15	0.07	0.90	0.33	4.40	1.27	3.09	36.88	1.22	38.10
35	25.54	2.66	0.82	0.15	0.07	0.90	0.33	4.61	1.33	3.24	39.66	1.28	40.94
40	27.76	2.83	0.85	0.15	0.07	0.90	0.33	4.85	1.40	3.40	42.55	1.34	43.90
45	30.04	3.03	0.89	0.15	0.08	0.90	0.33	5.10	1.47	3.58	45.57	1.42	46.99
50	32.38	3.25	0.92	0.15	0.08	0.90	0.33	5.39	1.56	3.78	48.74	1.49	50.24

Table VOC MAV 69
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.11	1.92	0.65	0.16	0.05	1.04	0.38	3.50	1.01	2.46	22.28	0.97	23.25
5	13.10	2.00	0.68	0.16	0.05	1.04	0.38	3.64	1.05	2.55	24.65	1.01	25.66
10	15.11	2.10	0.72	0.16	0.06	1.04	0.38	3.78	1.09	2.65	27.08	1.05	28.13
15	17.16	2.20	0.75	0.16	0.06	1.04	0.38	3.93	1.14	2.76	29.57	1.09	30.67
20	19.23	2.32	0.78	0.16	0.06	1.04	0.38	4.10	1.18	2.88	32.14	1.14	33.27
25	21.34	2.44	0.82	0.16	0.07	1.04	0.38	4.28	1.24	3.01	34.77	1.19	35.96
30	23.49	2.59	0.85	0.16	0.07	1.04	0.38	4.48	1.29	3.15	37.50	1.24	38.74
35	25.68	2.75	0.88	0.16	0.08	1.04	0.38	4.70	1.36	3.30	40.32	1.30	41.63
40	27.92	2.93	0.92	0.16	0.08	1.04	0.38	4.94	1.43	3.47	43.26	1.37	44.64
45	30.22	3.14	0.95	0.16	0.08	1.04	0.38	5.21	1.50	3.66	46.34	1.45	47.79
50	32.60	3.38	0.98	0.16	0.09	1.04	0.38	5.51	1.59	3.87	49.59	1.53	51.12

Table VOC MAV 70
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.16	1.96	0.71	0.16	0.06	1.19	0.44	3.55	1.03	2.49	22.76	0.99	23.75
5	13.16	2.05	0.75	0.16	0.06	1.19	0.44	3.69	1.07	2.59	25.16	1.02	26.18
10	15.18	2.15	0.78	0.16	0.06	1.19	0.44	3.84	1.11	2.69	27.61	1.06	28.68
15	17.24	2.26	0.81	0.16	0.07	1.19	0.44	4.00	1.15	2.81	30.13	1.11	31.24
20	19.33	2.38	0.85	0.16	0.07	1.19	0.44	4.17	1.20	2.93	32.72	1.16	33.88
25	21.45	2.52	0.88	0.16	0.08	1.19	0.44	4.36	1.26	3.06	35.40	1.21	36.61
30	23.62	2.67	0.91	0.16	0.08	1.19	0.44	4.57	1.32	3.20	38.16	1.27	39.43
35	25.83	2.84	0.95	0.16	0.08	1.19	0.44	4.79	1.38	3.36	41.03	1.33	42.36
40	28.09	3.03	0.98	0.16	0.09	1.19	0.44	5.05	1.46	3.54	44.03	1.40	45.43
45	30.42	3.25	1.01	0.16	0.09	1.19	0.44	5.33	1.54	3.74	47.17	1.48	48.65
50	32.82	3.51	1.05	0.16	0.09	1.19	0.44	5.64	1.63	3.96	50.50	1.56	52.06

Table VOC MAV 71
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.21	2.00	0.78	0.17	0.06	1.37	0.51	3.61	1.04	2.53	23.29	1.00	24.29
5	13.22	2.10	0.81	0.17	0.07	1.37	0.51	3.75	1.08	2.63	25.71	1.04	26.75
10	15.26	2.20	0.84	0.17	0.07	1.37	0.51	3.90	1.13	2.74	28.19	1.08	29.27
15	17.33	2.32	0.88	0.17	0.07	1.37	0.51	4.06	1.17	2.85	30.74	1.13	31.86
20	19.43	2.45	0.91	0.17	0.08	1.37	0.51	4.24	1.22	2.98	33.36	1.18	34.54
25	21.57	2.59	0.94	0.17	0.08	1.37	0.51	4.44	1.28	3.12	36.07	1.23	37.30
30	23.75	2.75	0.98	0.17	0.09	1.37	0.51	4.65	1.34	3.27	38.88	1.29	40.17
35	25.98	2.93	1.01	0.17	0.09	1.37	0.51	4.89	1.41	3.43	41.80	1.36	43.15
40	28.27	3.14	1.04	0.17	0.09	1.37	0.51	5.15	1.49	3.62	44.85	1.43	46.28
45	30.62	3.38	1.08	0.17	0.10	1.37	0.51	5.44	1.57	3.82	48.07	1.51	49.58
50	33.07	3.66	1.11	0.17	0.10	1.37	0.51	5.77	1.67	4.05	51.48	1.60	53.08

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Table VOC MAV 72
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.27	2.05	0.84	0.18	0.07	1.58	0.58	3.66	1.06	2.57	23.86	1.02	24.87
5	13.29	2.15	0.87	0.18	0.07	1.58	0.58	3.81	1.10	2.67	26.30	1.06	27.36
10	15.34	2.26	0.91	0.18	0.08	1.58	0.58	3.96	1.14	2.78	28.81	1.10	29.91
15	17.42	2.38	0.94	0.18	0.08	1.58	0.58	4.13	1.19	2.90	31.39	1.15	32.54
20	19.53	2.52	0.97	0.18	0.08	1.58	0.58	4.32	1.25	3.03	34.05	1.20	35.25
25	21.69	2.67	1.01	0.18	0.09	1.58	0.58	4.52	1.31	3.17	36.80	1.25	38.05
30	23.89	2.84	1.04	0.18	0.09	1.58	0.58	4.75	1.37	3.33	39.65	1.32	40.97
35	26.14	3.03	1.07	0.18	0.10	1.58	0.58	4.99	1.44	3.50	42.62	1.38	44.01
40	28.46	3.26	1.11	0.18	0.10	1.58	0.58	5.26	1.52	3.69	45.74	1.46	47.20
45	30.84	3.52	1.14	0.18	0.10	1.58	0.58	5.57	1.61	3.91	49.03	1.55	50.58
50	33.33	3.82	1.17	0.18	0.11	1.58	0.58	5.91	1.71	4.15	52.54	1.64	54.18

Table VOC MAV 73
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Two Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.33	2.10	0.90	0.18	0.08	1.82	0.67	3.72	1.07	2.61	24.48	1.03	25.52
5	13.36	2.20	0.94	0.18	0.08	1.82	0.67	3.87	1.12	2.71	26.95	1.07	28.03
10	15.42	2.32	0.97	0.18	0.08	1.82	0.67	4.03	1.16	2.83	29.49	1.12	30.61
15	17.52	2.45	1.00	0.18	0.09	1.82	0.67	4.20	1.21	2.95	32.10	1.17	33.27
20	19.65	2.59	1.04	0.18	0.09	1.82	0.67	4.40	1.27	3.09	34.80	1.22	36.02
25	21.82	2.75	1.07	0.18	0.09	1.82	0.67	4.61	1.33	3.23	37.59	1.28	38.86
30	24.04	2.94	1.10	0.18	0.10	1.82	0.67	4.84	1.40	3.40	40.49	1.34	41.83
35	26.31	3.14	1.14	0.18	0.10	1.82	0.67	5.10	1.47	3.58	43.52	1.41	44.93
40	28.66	3.38	1.17	0.18	0.11	1.82	0.67	5.38	1.55	3.78	46.70	1.49	48.20
45	31.08	3.66	1.20	0.18	0.11	1.82	0.67	5.70	1.65	4.00	50.08	1.58	51.66
50	33.60	4.00	1.23	0.18	0.11	1.82	0.67	6.06	1.75	4.25	53.69	1.68	55.37

Table VOC MAV 74
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 2000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.18	1.12	0.34	0.13	0.02	0.46	0.17	3.21	0.93	2.25	19.81	0.89	20.70
5	13.10	1.15	0.37	0.13	0.03	0.46	0.17	3.32	0.96	2.33	22.03	0.92	22.95
10	15.04	1.18	0.40	0.13	0.03	0.46	0.17	3.45	1.00	2.42	24.28	0.96	25.24
15	17.01	1.22	0.44	0.13	0.03	0.46	0.17	3.58	1.03	2.51	26.59	0.99	27.58
20	19.01	1.25	0.47	0.13	0.04	0.46	0.17	3.73	1.08	2.62	28.95	1.03	29.98
25	21.04	1.29	0.50	0.13	0.04	0.46	0.17	3.88	1.12	2.73	31.36	1.08	32.44
30	23.10	1.33	0.53	0.13	0.05	0.46	0.17	4.05	1.17	2.85	33.84	1.12	34.96
35	25.20	1.37	0.57	0.13	0.05	0.46	0.17	4.24	1.22	2.98	36.38	1.18	37.56
40	27.33	1.41	0.60	0.13	0.05	0.46	0.17	4.44	1.28	3.12	39.01	1.23	40.24
45	29.52	1.46	0.63	0.13	0.06	0.46	0.17	4.67	1.35	3.28	41.72	1.30	43.02
50	31.76	1.51	0.67	0.13	0.06	0.46	0.17	4.92	1.42	3.45	44.54	1.36	45.91

Table VOC MAV 75
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 3000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.20	1.14	0.37	0.14	0.03	0.53	0.20	3.25	0.94	2.28	20.08	0.90	20.98
5	13.13	1.17	0.40	0.14	0.03	0.53	0.20	3.37	0.97	2.37	22.31	0.94	23.24
10	15.08	1.20	0.43	0.14	0.04	0.53	0.20	3.50	1.01	2.46	24.58	0.97	25.56
15	17.06	1.23	0.47	0.14	0.04	0.53	0.20	3.64	1.05	2.55	26.91	1.01	27.92
20	19.07	1.27	0.50	0.14	0.04	0.53	0.20	3.79	1.09	2.66	29.29	1.05	30.34
25	21.11	1.31	0.53	0.14	0.05	0.53	0.20	3.95	1.14	2.77	31.73	1.10	32.82
30	23.19	1.35	0.57	0.14	0.05	0.53	0.20	4.13	1.19	2.90	34.23	1.14	35.38
35	25.30	1.39	0.60	0.14	0.06	0.53	0.20	4.32	1.25	3.03	36.81	1.20	38.01
40	27.46	1.43	0.63	0.14	0.06	0.53	0.20	4.53	1.31	3.18	39.47	1.26	40.73
45	29.66	1.48	0.67	0.14	0.06	0.53	0.20	4.77	1.38	3.34	42.22	1.32	43.55
50	31.92	1.53	0.70	0.14	0.07	0.53	0.20	5.02	1.45	3.53	45.09	1.39	46.48

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Table VOC MAV 76
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 4000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.22	1.15	0.40	0.15	0.04	0.61	0.22	3.30	0.95	2.32	20.36	0.92	21.28
5	13.16	1.19	0.43	0.15	0.04	0.61	0.22	3.42	0.99	2.40	22.61	0.95	23.56
10	15.13	1.22	0.47	0.15	0.04	0.61	0.22	3.55	1.03	2.49	24.91	0.99	25.89
15	17.12	1.25	0.50	0.15	0.05	0.61	0.22	3.70	1.07	2.59	27.25	1.03	28.28
20	19.14	1.29	0.53	0.15	0.05	0.61	0.22	3.85	1.11	2.70	29.66	1.07	30.73
25	21.19	1.33	0.56	0.15	0.06	0.61	0.22	4.02	1.16	2.82	32.12	1.11	33.24
30	23.28	1.37	0.60	0.15	0.06	0.61	0.22	4.20	1.21	2.95	34.65	1.17	35.82
35	25.41	1.41	0.63	0.15	0.06	0.61	0.22	4.40	1.27	3.09	37.26	1.22	38.48
40	27.59	1.46	0.66	0.15	0.07	0.61	0.22	4.62	1.33	3.24	39.96	1.28	41.24
45	29.82	1.51	0.70	0.15	0.07	0.61	0.22	4.87	1.40	3.41	42.76	1.35	44.11
50	32.10	1.56	0.73	0.15	0.07	0.61	0.22	5.14	1.48	3.60	45.67	1.42	47.10

Table VOC MAV 77
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 5000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.25	1.17	0.43	0.15	0.04	0.70	0.26	3.35	0.97	2.35	20.67	0.93	21.60
5	13.20	1.20	0.46	0.15	0.05	0.70	0.26	3.47	1.00	2.44	22.94	0.96	23.90
10	15.17	1.23	0.50	0.15	0.05	0.70	0.26	3.61	1.04	2.53	25.26	1.00	26.26
15	17.18	1.27	0.53	0.15	0.05	0.70	0.26	3.76	1.08	2.64	27.62	1.04	28.67
20	19.21	1.31	0.56	0.15	0.06	0.70	0.26	3.92	1.13	2.75	30.05	1.09	31.14
25	21.28	1.35	0.60	0.15	0.06	0.70	0.26	4.09	1.18	2.87	32.54	1.13	33.68
30	23.39	1.39	0.63	0.15	0.07	0.70	0.26	4.28	1.24	3.00	35.10	1.19	36.29
35	25.53	1.44	0.66	0.15	0.07	0.70	0.26	4.49	1.30	3.15	37.75	1.24	38.99
40	27.73	1.48	0.70	0.15	0.07	0.70	0.26	4.72	1.36	3.31	40.48	1.31	41.79
45	29.98	1.53	0.73	0.15	0.08	0.70	0.26	4.97	1.43	3.49	43.32	1.38	44.70
50	32.29	1.59	0.76	0.15	0.08	0.70	0.26	5.25	1.52	3.69	46.29	1.46	47.75

Table VOC MAV 78
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 6000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.28	1.19	0.46	0.16	0.05	0.81	0.30	3.40	0.98	2.38	21.01	0.94	21.95
5	13.24	1.22	0.50	0.16	0.05	0.81	0.30	3.53	1.02	2.48	23.29	0.98	24.27
10	15.23	1.25	0.53	0.16	0.06	0.81	0.30	3.67	1.06	2.57	25.63	1.02	26.65
15	17.24	1.29	0.56	0.16	0.06	0.81	0.30	3.82	1.10	2.68	28.02	1.06	29.08
20	19.29	1.33	0.59	0.16	0.06	0.81	0.30	3.98	1.15	2.80	30.47	1.11	31.58
25	21.37	1.37	0.63	0.16	0.07	0.81	0.30	4.16	1.20	2.92	32.99	1.16	34.15
30	23.50	1.41	0.66	0.16	0.07	0.81	0.30	4.36	1.26	3.06	35.58	1.21	36.79
35	25.66	1.46	0.69	0.16	0.08	0.81	0.30	4.58	1.32	3.21	38.26	1.27	39.53
40	27.88	1.51	0.73	0.16	0.08	0.81	0.30	4.81	1.39	3.38	41.04	1.34	42.38
45	30.15	1.56	0.76	0.16	0.08	0.81	0.30	5.08	1.47	3.56	43.93	1.41	45.34
50	32.50	1.62	0.79	0.16	0.09	0.81	0.30	5.38	1.55	3.77	46.96	1.49	48.45

Table VOC MAV 79
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 7000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.32	1.20	0.49	0.16	0.06	0.93	0.34	3.45	1.00	2.42	21.37	0.96	22.33
5	13.29	1.24	0.53	0.16	0.06	0.93	0.34	3.58	1.03	2.51	23.68	0.99	24.67
10	15.29	1.27	0.56	0.16	0.06	0.93	0.34	3.73	1.08	2.62	26.04	1.03	27.07
15	17.32	1.31	0.59	0.16	0.07	0.93	0.34	3.88	1.12	2.73	28.45	1.08	29.53
20	19.38	1.35	0.63	0.16	0.07	0.93	0.34	4.05	1.17	2.84	30.93	1.12	32.05
25	21.47	1.39	0.66	0.16	0.08	0.93	0.34	4.24	1.22	2.98	33.48	1.18	34.65
30	23.61	1.44	0.69	0.16	0.08	0.93	0.34	4.44	1.28	3.12	36.10	1.23	37.33
35	25.80	1.48	0.73	0.16	0.08	0.93	0.34	4.67	1.35	3.28	38.82	1.30	40.11
40	28.03	1.54	0.76	0.16	0.09	0.93	0.34	4.92	1.42	3.45	41.64	1.36	43.00
45	30.34	1.59	0.79	0.16	0.09	0.93	0.34	5.19	1.50	3.64	44.58	1.44	46.02
50	32.71	1.65	0.82	0.16	0.09	0.93	0.34	5.50	1.59	3.86	47.67	1.53	49.20

Table VOC MAV 30
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 8000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.36	1.22	0.53	0.17	0.06	1.07	0.40	3.50	1.01	2.46	21.77	0.97	22.74
5	13.34	1.25	0.56	0.17	0.07	1.07	0.40	3.64	1.05	2.55	24.10	1.01	25.11
10	15.35	1.29	0.59	0.17	0.07	1.07	0.40	3.79	1.09	2.66	26.48	1.05	27.53
15	17.39	1.33	0.62	0.17	0.07	1.07	0.40	3.95	1.14	2.77	28.92	1.10	30.01
20	19.47	1.37	0.66	0.17	0.08	1.07	0.40	4.13	1.19	2.90	31.42	1.14	32.57
25	21.58	1.41	0.69	0.17	0.08	1.07	0.40	4.32	1.25	3.03	34.00	1.20	35.20
30	23.74	1.46	0.72	0.17	0.09	1.07	0.40	4.53	1.31	3.18	36.66	1.26	37.92
35	25.94	1.51	0.76	0.17	0.09	1.07	0.40	4.76	1.38	3.34	39.42	1.32	40.74
40	28.20	1.56	0.79	0.17	0.09	1.07	0.40	5.02	1.45	3.53	42.28	1.39	43.68
45	30.53	1.62	0.82	0.17	0.10	1.07	0.40	5.31	1.53	3.73	45.28	1.47	46.76
50	32.95	1.68	0.86	0.17	0.10	1.07	0.40	5.64	1.63	3.96	48.44	1.56	50.00

Table VOC MAV 81
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 9000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.40	1.24	0.56	0.18	0.07	1.23	0.45	3.55	1.03	2.49	22.21	0.99	23.19
5	13.40	1.27	0.59	0.18	0.07	1.23	0.45	3.70	1.07	2.59	24.55	1.03	25.58
10	15.42	1.31	0.62	0.18	0.08	1.23	0.45	3.85	1.11	2.70	26.96	1.07	28.02
15	17.47	1.35	0.66	0.18	0.08	1.23	0.45	4.02	1.16	2.82	29.42	1.11	30.54
20	19.56	1.39	0.69	0.18	0.08	1.23	0.45	4.20	1.21	2.95	31.95	1.17	33.12
25	21.69	1.44	0.72	0.18	0.09	1.23	0.45	4.40	1.27	3.09	34.56	1.22	35.79
30	23.87	1.48	0.76	0.18	0.09	1.23	0.45	4.62	1.33	3.24	37.26	1.28	38.54
35	26.09	1.54	0.79	0.18	0.10	1.23	0.45	4.86	1.40	3.41	40.06	1.35	41.41
40	28.38	1.59	0.82	0.18	0.10	1.23	0.45	5.14	1.48	3.60	42.98	1.42	44.40
45	30.74	1.65	0.85	0.18	0.10	1.23	0.45	5.44	1.57	3.82	46.04	1.51	47.55
50	33.19	1.71	0.89	0.18	0.11	1.23	0.45	5.78	1.67	4.05	49.27	1.60	50.87

Table VOC MAV 82
Financial Cost of Operation of Multi-Axle Heavy Commercial Vehicles on Four Lane Roads (Rs/km)

Roughness = 10000

RF	Fuel Cost	Tyre Cost	Engine Oil Cost	Other Oil Cost	Grease Cost	Spare Parts Cost	Maintenance Cost	Fixed Cost	Depreciation Cost	Crew Cost	Total Cost	Commodity Cost	Grand Total
0	11.45	1.25	0.59	0.18	0.08	1.42	0.52	3.61	1.04	2.53	22.68	1.00	23.68
5	13.46	1.29	0.62	0.18	0.08	1.42	0.52	3.76	1.08	2.64	25.05	1.04	26.09
10	15.49	1.33	0.65	0.18	0.08	1.42	0.52	3.92	1.13	2.75	27.48	1.09	28.57
15	17.56	1.37	0.69	0.18	0.09	1.42	0.52	4.09	1.18	2.87	29.97	1.13	31.11
20	19.67	1.41	0.72	0.18	0.09	1.42	0.52	4.28	1.23	3.00	32.53	1.19	33.72
25	21.81	1.46	0.75	0.18	0.09	1.42	0.52	4.49	1.29	3.15	35.18	1.24	36.42
30	24.01	1.51	0.79	0.18	0.10	1.42	0.52	4.72	1.36	3.31	37.91	1.31	39.22
35	26.26	1.56	0.82	0.18	0.10	1.42	0.52	4.97	1.43	3.49	40.76	1.38	42.14
40	28.57	1.62	0.85	0.18	0.11	1.42	0.52	5.25	1.52	3.69	43.73	1.46	45.19
45	30.97	1.68	0.89	0.18	0.11	1.42	0.52	5.57	1.61	3.91	46.85	1.54	48.40
50	33.46	1.75	0.92	0.18	0.11	1.42	0.52	5.93	1.71	4.16	50.17	1.64	51.81

(The Official amendments to this document would be published by the IRC in its periodical, 'Indian Highways' which shall be considered as effective and as part of the code/guidelines/manual, etc. from the date specified therein)